North Spokane Freeway

Access Point Decision Report

September, 1998

Washington State Department of Transportation

Eastern Region

Eastern Region Administrator: Jerry Lenzi, P.E.

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Executive Summary

Project Description

The project area is located in the northeast quadrant of Spokane County and the City of Spokane (see Figure 1). The proposed action is to improve transportation safety and mobility through the City of Spokane and Spokane County between Interstate 90 (I-90), Northeastern Washington, and Canada. The action will ultimately provide a four to eight lane, full controlled access highway between I-90 on the south terminus KP 456.15 (MP 283.44) and US 2 and US 395, the northern terminus. The length of the proposed North Spokane Freeway (NSF) is approximately 16.1 kilometers (10 miles) and includes up to seven interchanges. In addition, about 5.6 kilometers (3.5 miles) of I-90, centered around the Thor/Freya Interchange, will require new construction. The project will provide a transportation facility that will accommodate high volume traffic movement, including the potential for high capacity transportation systems, between I-90 and areas north. This will help reduce congestion and related operational problems on city streets and county roads such as Division Street and Market Street, and will also remove regional trips from local streets.

1. Need for Access

Spokane area traffic is projected to increase by 35 percent by the year 2010 to 1,900,000 daily vehicle trips and by 50 percent by the year 2020 to 2,100,000 daily vehicle trips. Examination of the capacity of the existing arterial system, shows that major north/south system intersections will be operating at a Level Of Service (LOS) F at PM peak hour by the year 2020. In order to accommodate for this projected growth and congestion, a major alternative route connecting US 395 and US 2 to I-90 is necessary.

2. Reasonable Alternatives

Seven routes were initially considered for a NSF corridor to connect I-90 to US 395 and US 2, north of Spokane. Four of these seven routes were eliminated through the public involvement process and the remaining three routes were studied on their ability to mitigate congestion problems and their feasibility of construction. Based on the findings of the NSF Environmental Impact Statement (EIS), two possible routes were chosen for further study, Market/Greene and Havana. Both of these alternative routes connect to I-90 at the same location, in the vicinity of the Thor/Freya Interchange. This location was chosen due to geometric considerations such as weave distances, ramp lanes, and tapers.

Traffic models based on the Four Lakes to Idaho State Line (EIS)~1989 indicate that the LOS of I-90 will be greatly reduced with the increased traffic expected from the addition of the NSF. To accommodate for this increase in traffic congestion, additional lanes must be augmented to the existing I-90 six lane configuration between Liberty Park and Sprague Ave. Interchanges.

Connection Alternatives Considered

No Build

The NSF would not be constructed under this alternative. Spokane would continue to rely on minor construction and maintenance to mitigate congestion and growth problems.

Additional Lanes

One additional through lane and one additional auxiliary lane would be constructed in each direction, for a total of ten lanes, as recommended in the Four Lakes to Idaho State Line EIS. The connection of the NSF to I-90 with the additional lane configuration necessitates the use of an interchange system. Due to the need for creating a high speed directional facility for exchanging traffic between I-90 and the NSF, diamond, partial cloverleaf (par-clove) and full cloverleaf interchanges were dropped from consideration because of an anticipated low LOS.

Collector Distributor (C/D) System

This alternative consists of a fully directional and limited access C/D system which would add three additional through lanes and one auxiliary lane in each direction between the Liberty Park and Sprague Avenue Interchanges. These additional lanes would be constructed outside the existing lanes and would accommodate movements to and from 2nd and 3rd Avenues, Thor/Freya Interchange, the Valley Couplet and non I-90 mainline traffic. Mainline lanes would be created by separating the C/D system from existing I-90 by a median. Traffic heading to the NSF from westbound I-90 would have the option of connecting directly from the I-90 mainline or from the C/D. Eastbound I-90 traffic connecting to the NSF would use the C/D. Both eastbound and westbound traffic from the NSF would be able to access either the mainline or the C/D. A split ramp design would eliminate a large percentage of the weaving volumes. Combining a split ramp design with the C/D system has been determined to be the most efficient method to handle the projected traffic volume.

3. Operational Analysis

Projections show that with the NSF in operation in the year 2020 an additional 36,000 vehicles per day (as explained in the Operational Analysis section on page 26 of this text) will exist as compared to the no build condition. Without the construction of the C/D system, I-90 will experience peak period "stop-and-go" traffic congestion and all access and egress points will experience over capacity. Construction of the C/D system will reduce the number of ramp junctions on the mainline and divert traffic to the C/D system. This will result in an improvement to through traffic flow on I-90 to a LOS between B and D.

4. Access Connections and Design

The I-90 corridor consists of two major elements;

(1) The Collector Distributor System

(2) The North Spokane Freeway Interchange

The I-90 C-D system corridor begins near Liberty Park Interchange and runs adjacent to I-90 in an east-west direction. This alternative maintains this orientation until the Sprague Ave. Interchange where the C-D system ends. The entire C/D system lies between these interchanges and is approximately 4.8 kilometers (3 miles) in length. I-90 currently has three lanes in each direction of travel along the study corridor.

The I-90 Interchange is located west of the Thor/Freya Interchange at the point where Greene Street intersects with I-90. The alternatives begin at a common point at the north end of the NSF Interchange where the east and westbound ramps converge. This would mark the end of the interchange and the beginning of the viaduct sections for each alternative. Beginning at the centerline of I-90, the interchange runs approximately 1370 meters (4500 feet) north to its end as described above. This interchange will collect east/west traffic from the C/D and I-90 and transfer it onto the NSF.

5. Transportation and Land Use Plans

The construction of the NSF will be consistent with the City of Spokane's land use plans and also with local neighborhood's land use plans. The NSF is consistent with these land use plans in that it provides a high capacity limited access transportation system needed to relieve congestion on Division St. and other north/south arterials. Many of the regional land use plans express the need for a NSF and recommend the Market/Greene alternative.

6. Potential for Future Interchange Additions

Due to the construction the Collector / Distributor system in conjunction with the NSF connections within the limits of the Liberty Park Interchange and the Sprague Avenue Interchange, the potential for future interchange additions within these limits is not feasible.

7. Request Coordination

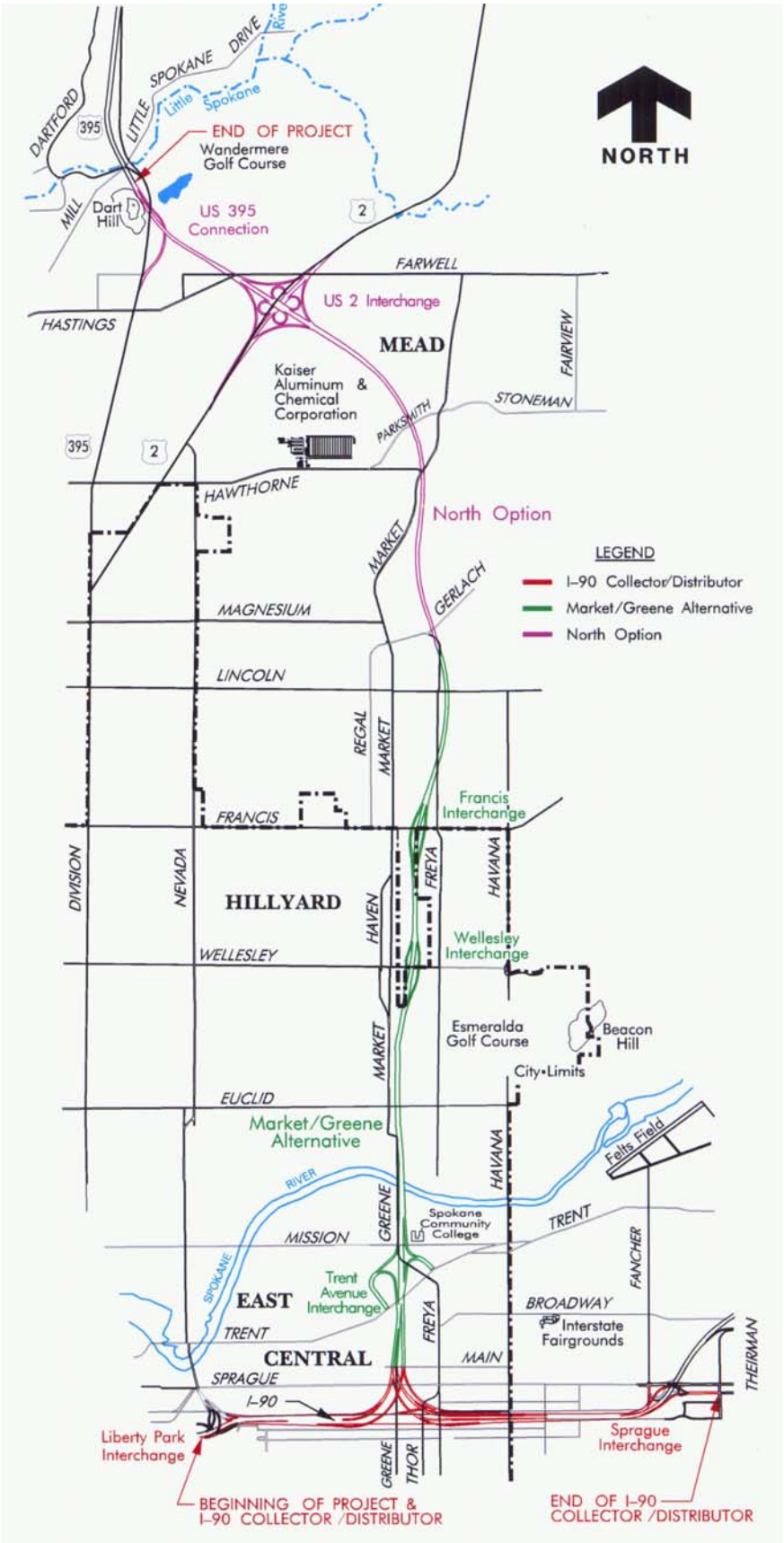
Private development is not a factor in the construction of the proposed I-90 Interchange C-D system. However, private development will occur as a result of the interchange.

8. Planning Requirements and Status of Environmental Processing of the Proposal

The Final Environmental Impact Statement (FHWA-WA-EIS-95-4-F) for this projecct was approved on April 3, 1997.

Summary

The project requires access into the existing I-90 corridor between Liberty Park and Sprague Ave. Interchanges (see Figure 1). This access point decision report shall present the need for this access, the benefits to the interstate with construction of a collector distributor C/D system, and show that it can be designed to provide the highest Level Of Service (LOS) and safety practicable.



North Spokane Freeway Preferred Alternative
Vicinity Map
Figure 1

1. Need for Access

Access to I-90 from the North Spokane Freeway (NSF) is necessary for the following reasons:

1. Regional trips between Interstate 90, Northeastern Washington and Canada, passing through Spokane, travel on an increasingly congested system.

Based on the existing and projected growth patterns, overall traffic will increase by 35 percent in 2010 with a projected 1,900,000 average annual daily vehicle trips and by 50 percent in 2020 with over 2,100,000 average annual daily vehicle trips. Projected trip distribution patterns follow the growth and show this highest traffic volumes resulting from through trips between the outlying areas of the Spokane region. Table-1 underscores the magnitude of the growth anticipated and the fact that external and through trips are expected to increase at higher rates due to current development patterns.

	1990 Vehicle Trips	2010 Vehicle Trips	2020 Vehicle Trips	Increase (1990-2020)
Internal Trips	124,440	166,622	188,302	51%
External Trips	4,747	7,035	8,645	82%
Through-Trips	1,807	2,686	3,274	82%
Total	130,994	176,343	200,221	53%

Internal Trips — Trips that begin and end in the Spokane traffic network
External Trips — Trips that either begin within the network but end outside the network or begin outside the network and end within it.
Through-trips — Trips that both begin and end outside the Spokane network but travel on roads within the Spokane network area.

Comparison of PM Peak Trip Types
Table-1

Analysis of the Spokane Regional Transportation Council (SRTC) traffic modeling shows that most of the traffic growth forecast to occur between 1990 and 2020 will be in the outlying areas and in the southern portion of the city of Spokane. A breakdown shows that the Central Business District (CBD) will account for only 6 percent of the trips. Close-in areas across the Spokane River to the north will account for 30 percent of the PM peak hour trips, and the Spokane Valley will account for 27 percent of the PM trips.

Table 1-1 outlines the distribution of these trips. In terms of volumes, it is shown that most of the traffic to and from Spokane's CBD is and will continue to be oriented to the north across the Spokane River. The largest increase in volume over the 30-year period is projected to be towards the east and the Spokane Valley. The highest through volumes will be between western Spokane and eastern Spokane, with the most growth, proportionally, forecast to be between the northern and eastern portions of Spokane.

This growth equates to a substantial north-south travel demand in the east portion of Spokane's north side extending north of the Division "Y." East-west demands are expected in the Valley from Francis to the Idaho border and from the vicinity of Francis Avenue to the vicinity of Trent Avenue and Pines Road. With the current lack of east-west connections on Spokane's north side, especially east of Market Street, this movement is being primarily accommodated by north-south access to and from I-90. The above PM peak hour trip projections reflect an overall increase of 54 percent. A major portion of this demand is projected in the project study area. As the following discussion will show, the capacity to handle this projected traffic will not exist in design year 2020.

	1990		2020		30 Year Change
To/From	**Volume**	**%**	**Volume**	**%**	**%**
CENTRAL BUSINESSS DISTRICT (CBD)					
North	5,411	41.5	7,611	38.7	40.7
East	2,976	22.8	5,196	26.4	74.6
South	3,305	25.3	4,849	24.7	46.7
West	1,350	10.4	2,010	10.2	48.9
Total CBD	**13,042**	**100**	**19,666**	**100**	**50.8**
EASTERN DISTRICT (ED)					
West	2,416	11.3	4,859	13.3	101.1
North	11,573	54.2	19,437	53.1	68.0
South	7,350	34.4	12,294	33.6	67.3
Total ED	**21,339**	**100**	**36,590**	**100**	**71.5**
SOUTHERN DISTRICT (SD)					
North	4,925	33.6	8,262	33.8	67.8
East	7,350	50.2	12,294	50.3	67.3
West	2,375	16.2	3,882	15.9	63.5
Total SD	**14,650**	**100**	**24,438**	**100**	**66.8**
WESTERN DISTRICT (WD)					
East	2,416	27.4	4,859	32.1	101.1
North	4,023	45.6	6,410	42.3	59.3
South	2,375	27.0	3,882	25.6	63.5
Total WD	**8,814**	**100**	**15,151**	**100**	**71.9**
NORTHERN DISTRICT (ND)					
South	4,925	24.0	8,262	24.2	67.8
East	11,573	56.4	19,437	57.0	68.0
West	4,023	19.6	6,410	18.8	59.3
Total ND	**20,521**	**100**	**34,109**	**100**	**66.2**

PM Peak Hour Distribution Patterns
Table 1-1

2. The NSF will not function as intended without connection to I-90.

The NSF-EIS Purpose and Need Statement of Chapter 1 states "The primary overall purpose of this project is to improve transportation safety and mobility through the city of Spokane and Spokane County between Interstate 90, Northeastern Washington, and Canada.". Because existing arterials would be required to replace access to I-90, the following objectives from the EIS can not be adequately met:

- Improve system linkage between major north side arterial and state routes, reflected in reduced travel times.
- Be consistent with regional planning to meet the needs of the Washington State Growth Management Act as implemented in Spokane County.
- Provide for safe movement of people and freight by providing a limited access facility that has fewer points of conflict than local signalized major arterials.

In terms of volumes, it is shown that most of the traffic to and from Spokane's CBD is, and will continue to be, oriented to the north across the Spokane River. The largest increase in volume over the thirty year period is projected to be towards the east and the Spokane Valley. The highest through volumes will be between western Spokane and eastern Spokane with the most growth forecast to be between the northern and eastern portions of Spokane.

This growth in demand equates to a substantial north/south travel demand in the east portion of Spokane's north side extending north of the Division "Y". East/west demands are expected to exist in the Valley from Havana to the Idaho border. There will also be an increase in the north/south demand from the vicinity of Francis to the Trent vicinity, as well as, east/west demands to the Pines Road vicinity. With the current lack of east/west connections on Spokane's north side, especially east of Market Street, this movement is being primarily accommodated by north/south access to/from I-90. The above PM peak hour trip projections reflect an overall increase of 53%. A major portion of this demand is projected in the project study area. As the following discussion will show, the capacity to handle this projected traffic will not exist in the design year if nothing is done.

When the total length of an arterial such as Division Street is examined, then an overall LOS can be developed. Table-2 identifies several of the key arterials, the projected overall LOS, and the average travel speeds for the PM peak hour. A LOS of E is defined as representing the operating conditions at or near the capacity level for the facility. Operations at LOS E are considered unstable and minor disruptions will cause system breakdown. These unstable conditions are anticipated over most of the arterial system within the study area by the year 2020 when the freeway is fully operational.

	1990			2010			2020		
Arterial	**LOS**	**Ave. Speed**		**LOS**	**Ave. Speed**		**LOS**	**Ave. Speed**	
		kph	**mph**		**kph**	**mph**		**kph**	**mph**
Division									
Northbound	E	24	15	F	21	13	F	19	12
Southbound	D	32	20	E	26	16	E	27	17
Market/Freya									
Northbound	D	35	22	E	24	15	E	27	17
Southbound	C	37	23	E	23	14	E	24	15
Francis									
Eastbound	C	42	26	C	40	25	D	34	21
Westbound	E	26	16	E	24	15	E	21	13
Wellesley									
Eastbound	C	37	23	D	27	17	E	26	16
Westbound	E	23	14	E	23	14	E	23	14
Mission									
Eastbound	C	39	24	F	16	10	F	16	10
Westbound	E	27	17	E	23	14	E	23	14
Trent									
Eastbound	C	39	24	E	27	17	E	27	17
Westbound	D	35	22	F	19	12	F	18	11

PM Peak Hour Arterial LOS and Congestion Summary
Table-2

3. In 2010 and 2020, a majority of the intersections analyzed will operate at a LOS F.

One key to examining the capacity of the existing system focuses on the operation of the arterial intersections. An examination of just individual arterial link segments will show that the links are at capacity in the year 2020. However, the overall operation of the arterial is dependent upon the intersections. Table-3 (Pg. 10) summarizes the intersection analyses and shows the existing and projected LOS for critical intersections within the project area. The table also identifies the volumes and corresponding capacities projected for the design year, gives another basis of comparison, and further reflects what the system condition will be. It is clear from this chart that the system is at or above capacity.

Between 1990 and 2010, PM peak hour traffic volumes entering individual intersections in the project area will increase, on average, by over 1,000 VPH. Increased delays at these critical intersections will reduce speeds and increase travel times along all major travel corridors in the study area.

Table-3 shows other key data on those intersections with a LOS of E or F. These include demand volume to capacity (V/C) ratios and expected average vehicle delays. The (V/C) ratios listed for several intersections exceed 1.0; therefore, indicating again that the projected demand exceeds the capacity of the intersection based on a weighted average of approach saturation values. V/C ratios exceeding 1.2 represent an over assignment of traffic by the traffic

model. Based on these projections, additional capacity on the existing system will not exist.

A derivative of the projected growth in traffic volumes is an increase in carbon monoxide which is mitigated better by a higher speed free flow facility than by the local street system. In particular, it is beneficial to move traffic from the intersections experiencing low LOS to the NSF.

To better improve north/south traffic flow through the Spokane area, the NSF can be integrated with Traffic System Management (TSM).

Traffic simulations and forecast traffic volumes were provided for the EIS by the Spokane Regional Transportation Council (SRTC). Technical details are described in the SRTC report: *Transportation Study Technical Report - Tmodel2*, February 1993. It should be noted that the AM Peak Analysis was provided for the I-90 area between Lincoln (on the west) and Broadway (on the east). It should also be stated that the AM model has not been calibrated.

Washington State Department of Transportation

INTERSECTION	Existing Conditions			2010 Conditions: No Build			2010 Conditions: Market-Green North			2010 Conditions: Market-Green South			2010 Conditions: Havana North			2010 Conditions: Havana South		
	LOS Summary	V/C Ratio	Vehicle Delay (Sec.)	LOS Summary	V/C Ratio	Vehicle Delay (Sec.)	LOS Summary	V/C Ratio	Vehicle Delay (Sec.)	LOS Summary	V/C Ratio	Vehicle Delay (Sec.)	LOS Summary	V/C Ratio	Vehicle Delay (Sec.)	LOS Summary	V/C Ratio	Vehicle Delay (Sec.)
Division/Farwell	E	0.87	48.1	F	1.28	103.1	F	0.94	72.2	E	0.93	43.2	F	0.95	72.1	E	0.82	40.6
Division/Hawthorne	F	0.86	44.7	F	1.28	117.0	F	0.90	65.3	F	0.96	84.0	F	0.95	94.6	F	1.06	98.2
Division/Country Homes	E	0.95	55.6	F	1.11	114.5	F	0.96	69.8	F	1.15	109.9	F	1.03	105.4	F	1.15	109.3
Division/SR 2	C			E	0.90	46.1	D			D			D			D		
SR 2/Hawthorne	D			F	0.95	73.1	D			F	1.10	108.5	C			F	1.16	119.1
Nevada/Hawthorne	B			C			B			B			B			B		
Market/Cox	F	1.33	84.0	F	3.12	150.0	F	1.27	100.0	F	1.57	133.9	F	1.14	84.1	F	1.26	112.2
Market/Hawthorne	D*			B			A			A			A			A		
Nevada/SR 2	E*			B			B			n/a			B			n/a		
Newport Highway/Farwell	C			F	0.98	74.2	E	0.94	49.7	D			E	0.91	50.6	C		
Division/Francis	F	1.18	124.2	F	1.22	107.8	F	1.36	111.6	F	1.36	110.1	F	1.44	109.5	F	1.36	109.7
Division/Wellesley	F	1.32	112.3	F	1.55	124.9	F	1.71	126.4	F	1.75	126.6	F	1.77	127.0	F	1.77	127.1
Division/N Foothills	F	0.97	87.4	E	0.95	57.8	E	0.94	53.9	E	0.95	54.6	E	0.93	49.5	E	0.95	46.7
Ruby/N Foothills	n/a			F	1.14	123.2	F	1.15	122.6	F	1.15	120.1	F	1.02	69.4	F	1.21	132.8
Division/Mission	F	1.18	95.6	D			D			D			D			C		
Ruby/Mission	n/a			F	1.90	137.0	F	1.65	135.8	F	1.70	137.0	F	1.74	136.8	F	1.70	136.8
Division NB/Trent	C			F	1.03	104.2	E	0.93	40.8	E	0.93	43.1	E	0.94	53.8	F	0.99	87.0
Browne/Spokane Falls	B			C			C			C			D			D		
Division NB/Sprague	F	0.97	63.8	F	2.61	122.4	F	1.29	87.0	F	1.26	87.9	F	1.28	88.2	F	1.34	88.8
Browne/Sprague	D			F	1.63	92.9	F	1.45	108.1	F	1.46	106.3	F	1.48	106.4	F	1.47	108.2
Division NB/2nd	C			D			D			C			D			D		
Browne/2nd	C			F	1.29	82.0	F	1.21	81.7	F	1.17	80.2	F	1.28	81.1	F	1.28	81.5
Division NB/3rd	D			F	1.05	97.0	F	1.10	117.9	F	1.10	121.6	F	1.09	116.2	F	1.10	116.8
Browne/3rd	C			F	1.03	68.6	F	1.05	70.3	F	1.04	69.5	F	1.06	70.2	F	1.06	70.8
Scott/2nd	D			B			B			B			B			B		
Scott/3rd	B			B			B			B			B			B		
Hamilton/Trent	D			F	1.06	98.1	F	1.27	111.9	F	1.24	114.9	F	1.21	115.4	F	1.12	101.5
Hamilton/Mission	E	1.05	54.4	F	1.64	88.8	F	1.34	89.4	F	1.39	90.5	F	1.38	88.3	F	1.36	87.5
Hamilton/Illinois	E	0.98	45.2	F	1.47	68.6	F	1.47	62.7	F	1.42	62.0	F	1.50	62.2	F	1.53	62.6
Nevada/Wellesley	F	0.91	60.3	F	1.20	81.0	D			E	0.88	40.7	D			D		
Nevada/Francis	E	0.80	42.9	E	0.94	55.3	E	0.90	53.9	E	0.87	46.6	E	0.87	46.5	E	0.88	48.1
Freya/Hartson	D			E	1.21	58.1	F	1.21	82.4	F	1.21	81.5	F	1.16	65.9	F	1.24	83.5
Freya/3rd	E	0.93	42.9	C			E	1.12	41.2	E	1.10	41.1	E	1.10	41.1	E	1.09	40.8
Freya/2nd	C			E	1.18	84.6	E	1.26	105.9	E	1.09	83.4	E	1.07	96.6	E	1.06	85.5
Freya/Sprague	C			F	1.42	93.7	F	1.37	110.3	F	1.38	112.4	F	1.66	106.3	F	1.36	124.1
Freya/Broadway	F	1.37	72.8	F	2.03	113.4	F	1.55	91.5	F	1.64	92.0	F	2.42	131.1	F	2.07	96.3
Freya/Trent	F	1.40	102.2	F	1.48	114.3	F	1.59	114.6	F	1.61	114.5	F	1.88	124.5	F	1.83	125.5
Freya/Mission	F	1.29	106.4	F	1.44	154.6	F	1.30	132.1	F	1.28	119.6	F	1.03	106.8	F	0.99	86.6
Haven/Wellesley	C			A			B			B			A			A		
Market/Wellesley	B			B			B			B			B			B		
Market/Francis	C			E	0.90	51.5	D			D			B			C		
CD EB/Thor	n/a			n/a			n/a			n/a			n/a			n/a		
CD WB/Thor	n/a			n/a			n/a			n/a			n/a			n/a		
NSF NB/Trent	n/a			n/a			B			B			D			D		
NSF SB/Trent	n/a			n/a			C			C			B			B		
NSF SB/Wellesley	n/a			n/a			B			B			A			B		
NSF NB/Wellesley	n/a			n/a			C			D			B			B		
NSF SB/Francis	n/a			n/a			B			C			B			B		
NSF NB/Francis	n/a			n/a			D			E			C			C		
NSF SB/Stoneman	n/a			n/a			n/a			n/a			n/a			n/a		
NSF NB/Stoneman	n/a			n/a			n/a			n/a	0.89	40.2	n/a			n/a		
NSF SB/SR 2	n/a			n/a			n/a			C			n/a			C		
NSF NB/SR 2	n/a			n/a			n/a			B			n/a			B		

INTERSECTION	2020 Conditions: No Build			2020 Conditions: Market-Green South			2020 Conditions: Market-Green North			2020 Conditions: Havana South			2020 Conditions: Havana North		
	LOS Summary	V/C Ratio	Vehicle Delay (Sec.)	LOS Summary	V/C Ratio	Vehicle Delay (Sec.)	LOS Summary	V/C Ratio	Vehicle Delay (Sec.)	LOS Summary	V/C Ratio	Vehicle Delay (Sec.)	LOS Summary	V/C Ratio	Vehicle Delay (Sec.)
Division/Farwell	F	1.50	108.2	F	0.92	70.4	F	1.29	129.8	E	0.91	59.3	F	1.24	120.7
Division/Hawthorne	F	1.32	101.0	F	1.17	100.2	F	1.00	93.6	F	1.17	101.3	F	0.94	67.6
Division/Country Homes	F	1.17	108.0	F	1.21	110.0	F	1.18	111.7	F	1.23	110.3	F	1.16	109.5
Division/SR 2	F	0.95	65.8	D			D			D			D		
SR 2/Hawthorne	F	1.09	103.8	F	1.22	133.9	C			F	1.20	120.7	E		
Nevada/Hawthorne	E	0.83	44.1	B			B			B			B		
Market/Cox	F	4.73	182.7	F	1.68	126.6	F	0.98	79.6	F	1.59	117.2	F	1.11	92.0
Market/Hawthorne	B			A			B			A			A		
Nevada/SR 2	E	0.84	54.1	n/a			B			n/a			B		
Newport Highway/Farwell	F	1.31	103.1	F	1.23	128.0	F	1.22	90.0	E	1.26	128.7	F	1.23	105.1
Division/Francis	F	1.31	115.1	F	1.38	111.1	F	1.40	111.4	F	1.41	111.2	F	1.43	111.2
Division/Wellesley	F	1.73	126.0	F	1.82	127.6	F	1.83	127.5	F	1.87	128.1	F	1.86	127.4
Division/N Foothills	F	1.02	88.4	E	0.95	48.5	E	0.97	50.2	E	0.95	40.1	E	0.95	53.6
Ruby/N Foothills	F	1.25	134.0	F	0.98	68.8	F	0.99	69.7	F	1.12	90.5	F	1.21	127.1
Division/Mission	D			D			D			D			D		
Ruby/Mission	F	1.94	136.6	F	1.67	136.5	F	1.72	136.5	F	1.73	135.5	F	1.78	135.5
Division NB/Trent	F	1.14	132.9	E	0.96	58.1	E	0.96	52.1	F	1.00	90.8	F	1.00	94.6
Browne/Spokane Falls	E			D			C			D			D		
Division NB/Sprague	F	1.52	131.1	F	1.40	91.2	F	1.41	91.4	F	1.39	90.5	F	1.43	91.9
Browne/Sprague	F	1.59	128.9	F	1.44	133.9	F	1.45	136.8	F	1.51	124.7	F	1.52	142.4
Division NB/2nd	F	0.87	64.5	F	0.84	69.8	F	0.84	68.0	F	0.84	61.4	E	0.83	59.8
Browne/2nd	F	1.37	85.8	F	1.38	90.8	F	1.39	90.8	F	1.41	89.1	F	1.40	87.8
Division NB/3rd	F	1.20	135.9	F	1.19	134.9	F	1.19	135.2	F	1.18	135.4	F	1.16	134.3
Browne/3rd	F	1.14	74.4	F	1.20	77.2	F	1.21	78.0	F	1.21	78.4	F	1.24	79.8
Scott/2nd	B			C			C			B			B		
Scott/3rd	B			C			C			B			B		
Hamilton/Trent	F	1.23	102.8	F	1.04	94.1	F	1.05	101.0	F	1.09	106.5	F	1.09	107.3
Hamilton/Mission	F	1.83	92.5	E	1.57	55.0	F	2.00	77.6	F	1.63	89.7	F	1.51	92.5
Hamilton/Illinois	F	1.62	75.6	F	1.41	63.3	F	1.43	63.1	F	1.95	69.6	F	1.53	63.5
Nevada/Wellesley	F	1.14	89.0	D			E	0.92	41.6	D			E	0.89	40.5
Nevada/Francis	F	1.01	81.6	F	0.98	75.6	F	1.00	84.5	E	0.92	59.2	F	0.95	63.3
Freya/Hartson	F	1.28	65.3	F	1.44	82.7	F	1.50	85.7	F	1.44	82.8	F	1.50	86.5
Freya/3rd	D			n/a			n/a			n/a			n/a		
Freya/2nd	F	1.32	90.0	n/a			n/a			n/a			n/a		
Freya/Sprague	F	1.67	109.2	F	1.35	110.2	F	1.43	121.1	F	1.51	139.2	F	1.83	112.3
Freya/Broadway	F	2.43	116.2	F	1.36	92.0	F	1.45	92.7	F	2.01	96.6	F	2.44	118.5
Freya/Trent	F	1.56	113.3	F	1.34	122.2	F	1.39	116.0	F	1.58	120.3	F	1.64	119.8
Freya/Mission	F	1.59	156.4	F	1.36	131.8	F	1.43	133.7	F	1.10	99.3	F	1.30	118.1
Haven/Wellesley	A			B			C			B			B		
Market/Wellesley	F	4.85	100.5	B			B			B			B		
Market/Francis	F	0.99	72.6	D			D			D			D		
CD EB/Thor	n/a			B			B			B			B		
CD WB/Thor	n/a			E			E			E			E		
NSF NB/Trent	n/a			B			B			E			D		
NSF SB/Trent	n/a			B	0.95	46.1	B	0.95	46.1	D	0.95	46.1	C	0.95	46.1
NSF SB/Wellesley	n/a			C			C			A	0.90	42.0	A		
NSF NB/Wellesley	n/a			D			D			B			B		
NSF SB/Francis	n/a			C			B			B			A		
NSF NB/Francis	n/a			B			B			D			C		
NSF SB/Stoneman	n/a			n/a			B			n/a			B		
NSF NB/Stoneman	n/a			n/a			D			n/a			B		
NSF SB/SR 2	n/a			D			n/a			D			n/a		
NSF NB/SR 2	n/a			B			n/a			B			n/a		

* Unsignalized - LOS for worst leg reported

Intersection LOS Conditions Existing and Future
Table 3

4. The Thor /Freya Interchange along with closure of the Altamont and Custer Interchanges proposed in the Four Lakes to Idaho State Line Environmental Impact Statement (EIS) in 1989 will not provide an adequate level of service in 2010 as projected in that EIS.

The EIS focused access to I-90 at the Thor/Freya Interchange from both north and south of I-90, between Liberty and Sprague Interchanges. The NSF will supplement the access to I-90 for the northern Spokane traffic growth beyond the 2010 design horizon utilized EIS. Also, the EIS projected I-90 mainline traffic volumes at 115,600 vehicles per day (vpd) where 1991 projections are 140,000 vpd and 2020 projected volumes climb to 160,000. Analysis of the Spokane Regional Transportation Council (SRTC) traffic modeling shows that most of the traffic growth forecast to occur between 1990 and 2020 will be in the outlying areas of the City of Spokane. A breakdown shows that the Central Business District (CBD) will account for only 6% of the trips, areas across the Spokane River to the north will account for 30% of the PM peak hour trip ends, and the Spokane Valley will account for 27% of the PM trips.

Modal Interrelationships

There are several state and federal laws that have been recently enacted that are affecting transportation throughout Washington:

- The state's Growth Management Act (GMA) which provides new tools for local governments to plan for growth and the transportation facilities that support that growth.
- The Clean Air Act which mandates transportation efforts to ensure healthy air.
- The federal Intermodal Surface Transportation Efficiency Act (ISTEA) which changes the way transportation decisions are made, giving state and local governments more flexibility to respond to their individual needs.

Federal law requires States to develop a management system to ensure that, transportation choices are made available, transportation modes are connected, safe, reliable, and seamless, and that transportation services are coordinated. The focus expands all modes of transportation and Washington State is meeting the intent of this federal mandate through the Statewide Multimodal Transportation Plan. This planning is being carried out in cooperation with local governments, regional agencies, and private transportation providers.

The existing system in the Spokane area consists of a state roadway system and is supplemented by a network of principal arterials owned by the City of Spokane and Spokane County. Along with transit service provided by the Spokane Transit Authority, Union Pacific and Burlington Northern Railroad run in the region with both passenger and freight operations. Non motorized facilities include such things as sidewalks, multipurpose trails, and bike lanes.

Safety

The North Spokane Freeway (NSF) will help meet the criteria of federal law by improving safety and connectivity.

Safety is improved whenever traffic is moved from the stop and go conditions that characterize a local arterial street system to free flow provided by a freeway. Generalized accident data indicate accident rates of 5.17 per million vehicle miles (MVM) for urban arterials and 1.43 per MVM for an urban freeway.

With its interchange locations, the NSF provides connections to three state highways. These include; US 290 (Trent Avenue) and two controlled access facilities at US 2 and US 395. Currently, there are no limited access facilities providing a high speed and high capacity connection to the northern part of Spokane from I-90. With an access connection to I-90, the NSF could provide the needed connection which enables the tying together of the limited access-free flow facilities as well as a connection to SR 290.

Providing safe roadways is a key service objective of the development and maintenance of the state highway system. Working with local agencies to help accomplish this goal is critical. Most arterials in the project vicinity, notably Division, Nevada/Hamilton, Market/Greene, Mission, Trent, and Sprague, are experiencing a high number of accidents. This accident rate would be expected to continue or worsen as congestion increases.

Based on the projected travel demands, the existing system will need to absorb an increased number of vehicles at the high accident locations. Statistically that equates to increased accident rates and less safe conditions. Although numerous spot improvements are identified in state and local plans to address some of these deficiencies, due to projected traffic increases, there is still a need to reduce the number of vehicles utilizing the system at these critical locations. As shown in the previous tables, the construction of the NSF would help alleviate the projected congestion and provide safer traveling conditions.

System Continuity

The creation of a specific High Occupancy Vehicles (HOV) system for the Spokane area has not yet evolved; however, the High Capacity Transportation (HCT) study is the first step. In the study it identifies the NSF corridor as a good location for north-south HCT development, but what that would specifically entail has not yet been identified.

When considering a regional HOV system, there currently exists no north/south facility that could be utilized for HOV access and still meet the objectives of this type of system. Considering north/south corridors such as Division or Hamilton, the effectiveness of a HOV system is reduced considerably due to the stop and go conditions that exist along these arterials. With the Valley Couplet identified as a prime east-west corridor, the NSF matches well in bringing north-south movements into the system.

HOV Facility

There is no present basis for predicting productivity of HOV lanes on the NSF and the I-90 / C/D system as there are no HOV lanes established beyond this proposal. Accordingly, it is recommended that they should not be constructed for freeway service until changes occur to warrant their development. HOV provisions on the NSF may involve the median with entry/exit provisions at I-90 and Wellesley or Francis. With entry/exit limited to the ends, traffic control would not be simplified. Even if the HOV need should not develop, projected traffic loads in 2020 indicates that incorporation of an additional reversible lane could help relieve congestion in the predominant traffic direction.

Provisions on the C/D allow for the proposed design. Actual location, whether the outside or inside lanes are used for HOV, has not been determined.

2. Reasonable Alternatives

Past studies have documented the need to improve the Spokane area's transportation network. Factors such as the recent increased growth of the Spokane region and its north side in particular will create a greater demand for a high capacity north/south transportation facility.

Initially, seven routes connecting I-90 to US 395 north of Spokane were identified as potential study areas for a North Spokane Freeway corridor. These routes were Government Way on the western edge of the City of Spokane, Maple/Ash Streets, Division Street, Hamilton/Perry Streets, Market/Greene Streets, Havana Street and Argonne Road in the Spokane Valley. These routes were identified by the 1985 Regional Transportation Plan Update. Four of these routes, Government Way, Maple/Ash Streets, Division Street and Argonne Road were subsequently eliminated through public involvement processes. The "North Spokane Transportation Study: Long Term Improvements" (1988) provides a more detailed evaluation of the remaining three routes.

In the Transportation Study completed by the Spokane Regional Transportation Council (SRTC), two basic criteria were utilized to rank the three remaining alternatives; mitigation of congestion problems, and feasibility of construction.

These two criteria determined the Market Greene Alternative to be the best solution. Other findings include:

- Between 1980 and 2020 traffic is anticipated to increase in the Spokane Metropolitan area by 84 percent.
- Non-Structural alternatives (increased use of mass transit, carpooling, staggered work hours, etc.) would not attract enough use to be cost effective.
- Improvements to existing arterial systems would not provide for anticipated growth and subsequent traffic increases.
- There would be a lack of funding by the year 2010 for a major freeway project. Alternative funding sources would have to be found to support a NSF project in the future.
- Despite general public support, past freeway proposals have been blocked by neighborhood groups through political action. Legislative, as well as public, support will be needed to see a freeway constructed.
- The primary function of a NSF would be to improve regional mobility through Spokane, not to provide specific area access. A NSF would take some of the burden away from Division Street, the current regional north/south traffic route.

In August of 1991 the project Interdisciplinary Team (IDT) dropped the Hamilton/Perry route from the Final Study Plan. The reasons for elimination of this alternative are as follows:

- Potential adverse community and environmental impacts.
- Route elimination is consistent with the following studies and City and neighborhood plans:
    - ◊ 1988 Long Term Improvements Study

- ◊ City Comprehensive Plan, Arterial Street Plan
- ◊ The Hillyard Neighborhood Specific Plan
- ◊ The Chief Garry Neighborhood Specific Plan
- ◊ The Logan Neighborhood Specific Plan

- Based on a summary matrix of the 28 environmental study areas for this project (including a Decision Matrix) found in the "North Spokane Freeway: Study of Route Alternatives, Evaluation Matrix" (1991), the Hamilton/Perry route had the most severe impacts of the three remaining alternatives.
- Written comments from the following:
  - ◊ Mayor of Spokane
  - ◊ City Planning Commission Resolution
  - ◊ Open House comments from the Logan Neighborhood Group
  - ◊ Open House comments from Gonzaga Prep High School
- Impacts to housing would be greatest along the Hamilton/Perry route resulting in major impacts to existing neighborhoods.

The remaining two route alternatives, Market/Greene and Havana, have been divided into the following five areas for the purposes of this study:

- I-90
- Market/Greene Alternative (Preferred Alternative)
- Havana Alternative
- North Option (Preferred Alternative)
- South Option

The primary alternative routes, Market/Greene and Havana, both connect to I-90 at the same location. From I-90 each runs northerly until they reach an area between Lincoln Road and Gerlach Road. At this point both routes converge and the North/South Options begin. Of these, one option runs south of Kaiser Aluminum & Chemical Corporation's Mead plant and the other to the north of the plant. Both converge on US 395 at the same location, just south of the Little Spokane River.

Spokane currently possesses no large capacity, limited, or fully access controlled route between I-90 and areas to the North. Both existing north/south transportation networks, US 2 and US 395, channel traffic from I-90 onto Division Street, a major Spokane arterial. At the present rate of growth, Division Street will become highly congested causing overflow to other north/south arterials and side streets. The current Division Street widening project will serve as a temporary fix for helping relieve north/south commuter congestion.

No Build Alternative

Under this alternative, there would be no freeway construction. Spokane would continue to rely on existing north/south arterial routes. Division Street would remain the designated route for US 395 and US 2. Minor construction,

maintenance and safety improvements would continue to occur. No substantial capacity improvements would be done.

Build Alternatives

a)I-90 Corridor

Traffic volume increases can be expected on I-90 with the addition of the NSF/I-90 connection and the construction of the South Valley Arterial connecting at the Sprague Ave. Interchange. Preliminary traffic data received from the SRTC indicates an increased exchange of about 196,000 vehicles per day (VPD) on a NSF/I-90 Interchange in the year 2020 from the present 90,000 VPD.

Preliminary traffic models, based on the Four Lakes to Idaho State Line Environmental Impact Statement (EIS) ~ 1989 recommendations, indicate that this increased traffic volume will greatly reduce the Level Of Service (LOS) on I-90 if there are no improvements to the existing lane configurations. To accommodate this increase, minimize congestion from projected traffic volumes, and maintain a reasonable level of service, any build alternative must include augmentation of additional lanes to the existing 6 lane configuration on I-90 between Liberty Park and Sprague Interchanges.

Two lane construction options were created to accommodate the need for more lanes:

Option 90A-Additional Lanes

As recommended in the Four lakes to Idaho State Line EIS, this option would construct one additional through-lane and one auxiliary lane in each direction of travel, for a total of ten lanes. This configuration would retain 2nd and 3rd Avenues, but move their footprint outward from their current position to accommodate the increased number of lanes.

Option 90B-Collector/Distributor (C/D) system

This option consists of building a Collector/Distributor (C/D) system into the existing I-90 corridor between Liberty Park and Sprague Ave. Interchanges.

The C/D system would add three additional through-lanes and one auxiliary lane in each direction of travel for a total of 14 lanes. These additional lanes would be constructed outside the existing lanes and would accommodate movements from the NSF Interchange and local arterials. A median would separate the C/D from the existing lanes, essentially creating express lanes between Liberty Park and Sprague Ave. Interchanges.

b.) I-90/NSF Interchange

The design effort focused on creating a high speed, directional facility for exchanging traffic between I-90 and the NSF facility. Because of this focus, design options were narrowed down very quickly. Diamond, par-clove and full cloverleaf were dropped from consideration due to an anticipated low LOS. A fully directional facility, as it relates to major movements, was the

focus. Since there was no major exchange of traffic anticipated south of I-90, a trumpet design, similar to the Liberty Park Interchange, was carried forward.

Once it was decided to utilize a full directional interchange, the question of local access became an issue. Local access options form the basic difference between interchange design choices. The options are as follows:

1) Direct access to/from 2nd Ave. to the NSF by way of on/off ramps between the middle of the trumpet interchange ramps.
2) Loop ramps from the NSF to Sprague Avenue.
3) No direct local NSF access at I-90. Local access would be accomplished by traveling north to Trent Avenue Interchange.

It was decided to carry forward with the last option, no direct local access to the NSF at I-90. The first two options were dropped for the following reasons:

- Significant impacts in the area adjacent to the I-90 Interchange. These impacts were due mainly to the geometrics required to construct local access ramps.
- Weaving distances between the I-90 Interchange and the Trent Avenue Interchange are at a minimum. By adding the additional lanes from local access ramps, the weaving distances would fall below acceptable minimums, requiring design deviations and further impacts to local businesses and neighborhoods.
- Safety.
- Ramps entering and exiting from the left/inside edge of the facility.

Based on the two alternative corridors, two interchange locations were identified for study. These options are as follows:

Option 90C-Havana Street Interchange

This fully directional interchange is located at the intersection of Havana Street and I-90.

Option 90D-Vicinity Thor/Freya Interchange

This fully directional interchange is located in the vicinity of Thor/Freya Streets and I-90.

Early on in the interchange analysis process, it became apparent that only one interchange location was possible along this segment of I-90. Due to geometric considerations, i.e. weave distances, ramp lanes and tapers, that location was determined to be in the vicinity of the Thor/Freya exits. Given this fact, the design effort focused on the development of a single interchange design serving the connection for both the Market/Greene as well as the Havana Alternative. The IDT approved this single interchange concept at a June 23, 1992 meeting.

Project Alternatives Considered

No Build

Involves maintaining the continued operation of the existing roadway system including needed safety improvements.

Transportation System Management (TSM)

This alternative includes two areas: Transportation Demand Management (TDM) (Commute Trip Reduction (CTR), pedestrian and bicycle modes, transit) and operational management strategies (signal timing and interconnect).

Transportation Demand Management (TDM)

TDM addresses traffic congestion by focusing on reducing travel demand rather than increasing transportation supply. The objective is to increase transportation efficiency of the existing system. The focus is to reduce trips or accommodate trips in fewer vehicles. TDM alternatives include ride sharing, flextime, use of transit, walking, and bicycling, to name a few. The Commute Trip Reduction law is a key application of TDM strategies.

Operational Management Strategies

Operational management strategies are designed to help improve traffic flow on the existing arterial system. Traffic signal improvements generally provide the greatest payoffs for reducing congestion. Basic signal improvements considered include: updating the equipment, improving timing plans, and interconnecting signals. The city of Spokane is currently developing a plan for upgrading existing signal systems citywide.

Mass Transit

Construction of High Capacity Transportation (HCT) systems such as bus and rail systems.

Improvements to Existing Facilities

Improvements to existing facilities would employ such actions as development of new two-way-left-turn lanes, major intersection modifications (such as right-turn lanes), and widening of roadways to accommodate new lanes. All these improvements would be used to create more system capacity and serve as an alternative solution to building a complete new facility.

New Facility

The need for the construction of a new facility is based on the findings and recommendations of previous studies related to the North Spokane Freeway (NSF). Previous studies include the 1985 Spokane Regional Transportation Plan and the 1988 " North Spokane Transportation Study: Long - Term Transportation Improvements". The "build" corridors that served as the starting point for this study are as follows.

1) Hamilton/Perry
2) Market/Greene (Preferred Alternative)
3) Havana

Major Metropolitan Investment Study (MIS)

The purpose and need for this new study element stems from requirements of the Intermodal Transportation Efficiency Act's (ISTEA) legislation to combine the Federal Highway Administration (FHWA) and Federal Transit Administration (FTA) long range planning processes to meet the changes in transportation planning and funding. The focus of the MIS was to relate each alternative to their effectiveness in accommodating, or reducing, the capacity/demand projections for the project opening year of 2020 (see table-4).

Alternatives Rejected from Further Study

Transportation System Management (TSM)
Mass Transit

These alternatives were considered and studied through the completion of the project expertise studies. The individual study findings, coupled with the results of the MIS, show that each fail to meet all or key project purpose and need objectives. Consequently, they have been eliminated from further consideration.

The MIS addresses the effectiveness of each alternative in meeting the projected traffic demand and capacity needs as stand-alone solutions and also when combined. The MIS findings support the conclusion that additional capacity is needed after implementation of these programs. None of these alternative solutions, when considered as stand-alone solutions, satisfy the projected system demand/capacity needs as effectively as the construction of the NSF. The conclusion drawn from the MIS is that only when considering a complete system of programs, i.e. new facility plus the Mass Transit and TSM solutions identified above, are the Spokane area transportation needs shown to be effectively addressed.

Improvements to Existing Facilities

This alternative failed to meet key project objectives, primarily in the area of effectively reducing travel times and efficient multi-modal and intramodal movement of goods and people.

Hamilton/Perry Alternative

The Hamilton/Perry Alternative was dropped from further evaluation during the Final Study Plan preparation. Key reasons included past and present neighborhood controversy, conclusions from past studies, inconsistency with local plans, and numerous adverse environmental impacts.

Alternatives Selected for Further Study

No-Build Alternative

This alternative is described earlier in this document. It has been carried forward to provide a baseline against which to weigh the new facility alternatives. The alternative was not selected as the preferred alternative because it fails to meet any of the objectives of the Purpose and Need of the EIS.

New Facility

The alternatives carried forward and presented in this document as the best long-term transportation solution for the Spokane area, involves the construction of a new facility. The new facility routes examined include the following:

1) Market/Greene (Preferred Alternative)
2) Havana

Common to Both the Market/Greene and Havana Alternatives

1) North Connection Option (Preferred Alternative)
2) South Connection Option
3) I-90 Collector Distributor (C/D) System (part of Preferred Alternative)

Traffic projections for the year 2020, with the NSF connected directly to I-90, show traffic in the section of I-90 between Liberty Park Interchange and Sprague Ave. Interchange increasing from the existing 90,000 vehicles per day to over 196,000 vehicles per day. The construction of a collector distributor (C/D) system has been determined to be the most efficient method to handle the projected traffic.

As noted above, the construction of a new facility would be only part of the transportation solution. The continuation and further development of the TSM and Mass Transit alternatives would happen concurrently, and all these components would combine to make a complete area transportation system.

Washington State Department of Transportation	PROJECTED 2020 NO BUILD					TSM ALTERNATIVE			MASS TRANSIT ALTERNATIVE			MASS TRANSIT & TSM COMBINED			BUILD NEW FACILITY ALTERNATIVE			NEW FACILITY, MASS TRANSIT & TSM COMBINED		
INTERSECTION	LOS Summary	V/C Ratio	Vehicle Delay (Sec.)	Intersection Capacity	Intersection Volume	Est. Decrease in Volume	New Intersection Volume	New V/C Ratio	Est. Decrease in Volume	New Intersection Volume	New V/C Ratio	Est. Decrease in Volume	New Intersection Volume	New V/C Ratio	Est. Decrease in Volume	New Intersection Volume	New V/C Ratio	Est. Decrease in Volume	New Intersection Volume	New V/C Ratio
Division/Farwell	F	1.50	108.2	4251	6377	395	5982	1.41	261	6116	1.44	395	5982	1.41	1272	5105	1.20	1667	4710	1.11
Division/Hawthorne	F	1.32	101.0	3586	4734	294	4440	1.24	194	4540	1.27	294	4440	1.24	809	3925	1.09	1103	3631	1.01
Division/Country Homes	F	1.17	108.0	4146	4851	301	4550	1.10	199	4652	1.12	301	4550	1.10	112	4739	1.14	413	4438	1.07
Division/SR 2 *	F	0.95	65.8	4562	4334	269	4065	0.89	321	4013	0.88	269	4065	0.89	632	3702	0.81	901	3433	0.75
SR 2/Hawthorne	F	1.09	103.8	4453	4854	301	4553	1.02	199	4655	1.05	301	4553	1.02	944	3910	0.88	1245	3609	0.81
Nevada/Hawthorne	F	0.83	44.1	4606	3823	237	3586	0.78	157	3666	0.80	237	3586	0.78	1467	2356	0.51	1704	2119	0.46
Market/Coxe	F	1.24	182.7	3360	4179	259	3920	1.17	171	4008	1.19	259	3920	1.17	1982	2197	0.65	2241	1938	0.58
Nevada/SR 2	F	0.84	54.1	3756	3155	196	2959	0.79	129	3026	0.81	196	2959	0.79	703	2452	0.65	899	2256	0.60
Newport Highway/Farwell	F	1.31	103.1	3592	4705	292	4413	1.23	193	4512	1.26	292	4413	1.23	-143	4848	1.35	149	4556	1.27
Division/Francis *	F	1.31	115.1	5642	7391	458	6933	1.23	474	6917	1.23	458	6933	1.23	-48	7439	1.32	410	6981	1.24
Division/Wellesley *	F	1.73	126.0	4849	8388	520	7868	1.62	606	7782	1.60	520	7868	1.62	-302	8690	1.79	218	8170	1.68
Division/N. Foothills	F	1.02	88.4	3898	3976	247	3729	0.96	163	3813	0.98	247	3729	0.96	174	3802	0.98	421	3555	0.91
Ruby/N. Foothills *	F	1.25	134.0	5016	6270	389	5881	1.17	539	5731	1.14	389	5881	1.17	689	5581	1.11	1078	5192	1.04
Ruby/Mission *	F	1.94	136.6	3809	7389	458	6931	1.82	568	6821	1.79	458	6931	1.82	947	6442	1.69	1405	5984	1.57
Division NB/Trent	F	1.14	132.9	4119	4696	291	4405	1.07	193	4503	1.09	291	4405	1.07	485	4211	1.02	776	3920	0.95
Division NB/Sprague	F	1.52	131.1	3429	5212	323	4889	1.43	214	4998	1.46	323	4889	1.43	541	4671	1.36	864	4348	1.27
Browne/Sprague	F	1.59	128.9	3575	5684	352	5332	1.49	233	5451	1.52	352	5332	1.49	348	5336	1.49	700	4984	1.39
Division NB/2nd	F	0.87	64.5	4574	3979	247	3732	0.82	163	3816	0.83	247	3732	0.82	369	3610	0.79	616	3363	0.74
Browne/2nd	F	1.37	85.8	3163	4333	269	4064	1.28	178	4155	1.31	269	4064	1.28	143	4190	1.32	412	3921	1.24
Division NB/3rd	F	1.20	135.9	3437	4124	256	3868	1.13	169	3955	1.15	256	3868	1.13	49	4075	1.19	305	3819	1.11
Browne/3rd	F	1.14	74.4	3727	4249	263	3986	1.07	174	4075	1.09	263	3986	1.07	-63	4312	1.16	200	4049	1.09
Hamilton/Trent	F	1.23	102.8	5554	6832	424	6408	1.15	280	6552	1.18	424	6408	1.15	1279	5553	1.00	1703	5129	0.92
Hamilton/Mission	F	1.83	92.5	4550	8327	516	7811	1.72	341	7986	1.76	516	7811	1.72	1650	6677	1.47	2166	6161	1.35
Hamilton/Illinois	F	1.62	75.6	3594	5822	361	5461	1.52	239	5583	1.55	361	5461	1.52	1705	4117	1.15	2066	3756	1.05
Nevada/Wellesley	F	1.14	89.0	4470	5096	316	4780	1.07	209	4887	1.09	316	4780	1.07	889	4207	0.94	1205	3891	0.87
Nevada/Francis	F	1.01	81.6	4640	4686	291	4395	0.95	192	4494	0.97	291	4395	0.95	440	4246	0.92	731	3955	0.85
Freya/Hartson	F	1.28	65.3	3773	4829	299	4530	1.20	198	4631	1.23	299	4530	1.20	-184	5013	1.33	115	4714	1.25
Freya/2nd	F	1.32	90.0	3390	4475	277	4198	1.24	183	4292	1.27	277	4198	1.24			0.00	277	4198	1.24
Freya/Sprague	F	1.67	109.2	3467	5790	359	5431	1.57	237	5553	1.60	359	5431	1.57	154	5636	1.63	513	5277	1.52
Freya/Broadway	F	2.43	116.2	1754	4263	264	3999	2.28	175	4088	2.33	264	3999	2.28	126	4137	2.36	390	3873	2.21
Freya/Trent	F	1.56	113.3	4779	7456	462	6994	1.46	306	7150	1.50	462	6994	1.46	653	6803	1.42	1115	6341	1.33
Freya/Mission	F	1.59	156.4	5188	8249	511	7738	1.49	338	7911	1.52	511	7738	1.49	2071	6178	1.19	2582	5667	1.09
Market/Wellesley	F	1.01	100.5	2520	2549	158	2391	0.95	105	2444	0.97	158	2391	0.95	-418	2967	1.18	-260	2809	1.11
Market/Francis	F	0.99	72.6	3742	3705	230	3475	0.93	152	3553	0.95	230	3475	0.93	242	3463	0.93	472	3233	0.86
V/C Average		**1.32**						**1.24**			**1.26**			**1.24**			**1.15**			**1.10**

Note: * HOV lane on Division would impact only these intersections.
Reduction of volume would apply to only the PM Peak Hour, northbound and southbound legs of the intersections.

Capacity Demand Projections
Table 4

3. Operational Analysis

Collector Distributor (C/D) Operation

Traffic projections for the year 2020, with the NSF connected directly to I-90, show traffic in the section of I-90 between Liberty Park Interchange and Sprague Ave. Interchange increasing from the existing 90,000 vehicles per day to over 196,000 vehicles per day. When compared to the Average Daily Traffic (ADT) shown in Table-5, this is an additional 36,000 vehicles from that projected in the no-build condition.

Existing Average Daily Traffic (ADT)	2010 ADT	2020 ADT
90,000	140,000	160,000

Estimated ADTs are shown — Numbers were developed from raw p.m. peak values; PM peak numbers were estimated to equal 10 percent of ADT

Traffic Projections for I-90 Liberty Park Interchange to Sprague Avenue Interchange Without the NSF
Table-5

A 1700 vehicle per hour/per lane service flow, without considering the negative Level of Service (LOS) impacts due to vehicle weaving movements, equals a LOS D. Based on this flow rate and the number of vehicles projected, a need will exist for an additional three through lanes plus an auxiliary in each direction along I-90 to enable efficient operation of the facility. This can be accomplished by adding lanes on the outside of the existing I-90 roadway, or by constructing a C/D system. The construction of a C/D system has been determined to be the most efficient method to handle the projected traffic.

The C/D system will consist of three new lanes each direction with an auxiliary lane between interchanges. It will be separated from mainline I-90 by a barrier/median and vertical alignment. Entrances and exits to the C/D roadway would be limited to the Liberty Park, Thor/Freya, Sprague Ave. and NSF Interchanges.

Access at Liberty Park Interchange would allow a direct route to/from existing 2nd and 3rd Avenues and Spokane's Central Business District (CBD).

The Sprague Ave. Interchange connection will allow direct access to and from the proposed Valley Couplet system.

The C/D will reduce the ramp connections on this section of mainline I-90 between Liberty Park and Sprague Ave. Interchanges. Only ramps from the NSF will connect with the mainline.

Table-6 summarizes the ramp junction LOS (No-Build) on the I-90 segment between the Liberty Park and Sprague Ave. Interchanges. Under existing conditions, in the eastbound direction, all ramp junctions operate at a LOS E or better. In the westbound direction, the on-ramp from Thor Street operates at a LOS F, with all other ramp junctions operating at a LOS E or better.

Level of Service (LOS)

	1990 Existing		2010 No Build		2020 No Build w/o Couplet		2020 No Build w/Couplet	
Ramp Description	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**
EB: Off to Hamilton	B	C	#	E	D	E	F	F
EB: On from Hamilton	C	C	#	F	F	F	F	F
EB: Off to Thor	C	C	#	F	F	F	F	F
EB: On from Thor	C	C	#	F	F	F	F	F
EB: Off to Sprague	C	C	#	F	C	F	D	F
EB: On from Sprague	C	D	#	C	D	E	C	D
WB: Off to Sprague	D	D	#	C	E	D	D	D
WB: On from Sprague	D	C	#	D	E	D	F	D
WB: Off to Thor	D	D	#	D	F	F	F	F
WB: On from Thor	D	C	#	F	F	F	F	F
WB: Off to Hamilton	D	C	#	E	F	F	F	F
WB: On from Hamilton	C	C	#	E	E	E	E	E

Ramp Junction Level of Service Summary I-90
Peak Conditions for No Build
Table-6

Table-6 also summarizes the 2010 ramp junction LOS on this I-90 segment without the construction of the NSF. Table-5 shows that by the year 2010, forecast I-90 mainline volumes exceed 1990 levels by over 50 percent. In the eastbound direction, most ramp junctions will operate at a LOS F. In the westbound direction, two ramp junctions will operate at a LOS F, with all others at a LOS E or better.

By 2020, forecast mainline volumes exceed 1990 levels by over 75 percent in the eastbound direction and 60 percent westbound. As a result, in 2020 I-90 freeway and ramp operation will degrade further from 2010 operating conditions, with most ramp junctions operating at a LOS F in both the eastbound and westbound directions.

The C/D system serves two main functions:

1) It provides access between the NSF and I-90, eliminating most NSF and local access ramp influences to the I-90 mainline, and serves regional north/south travel demand in the greater Spokane area.

2) It provides some relief to the I-90 freeway between the Liberty Park and Sprague Ave. Interchanges by forcing NSF and locally destined traffic off the mainline to a separate freeway network. This will relieve "over capacity" congestion on the mainline and accommodate the forecast demand to and from the freeway in area.

In 2010, the NSF provides some improvement along I-90 even though there is no direct connection. The construction staging will not provide a connection to I-90 in 2010. The NSF will connect to US 290 at Trent Avenue. Under these conditions, during the PM peak hour there is a seven percent reduction in traffic using the I-90/Thor Interchange. This is primarily a result of travelers using the surface streets to get to Trent Avenue and accessing the NSF.

With the construction of the C/D system along I-90 in 2020 (as shown in Table-7), freeway configurations in this section will change dramatically. On I-90 itself, access and egress from the freeway will be limited to the C/D and a few select locations. The

reduction in the number of ramp junctions on the mainline and the diversion of traffic to the C/D system will result in an improvement to through traffic flow on I-90 to a LOS D or better.

Splitting three two-lane ramps at the NSF Interchange will eliminate most weaves for the C/D and the interstate mainline traffic. This allows direct channeling of most traffic to access desired ramps.

Although the construction of the C/D system will not alleviate all of the congestion conditions forecast for the year 2020, it will eliminate a majority of the access points along this segment of I-90 and their effects on the mainline by consolidating them into the C/D system. Without the C/D system in place, this segment of I-90 will experience similar "stop-and-go" peak period traffic congestion. The C/D can take advantage of ramp metering to regulate traffic flow at some on ramps such as the eastbound 3rd Avenue and Freya Way ramps.

Surface Street Operation

With the construction of the C/D system, the existing 2nd Avenue and 3rd Avenue couplet will be replaced. No arterial street will be closed but access between Altamont Street and I-90 will be no longer possible because Altamont and the C/D will be grade separated. In addition to the loss of access to I-90 from Altamont Street because of the C/D system, north/south local streets between Hartson and Sprague will not be able to access I-90 via the 2nd/3rd couplet. Traffic from the South Hill area destined for or I-90 will need to use Thor/Freya. To access the NSF, traffic will need to use the Trent Ave. Interchange.

With no provision for the Thor/Freya traffic south of I-90 to enter or leave the NSF except at the Trent Interchange, the intersection of Sprague and Thor/Freya will not handle the traffic demand in 2010. The intersection already operates at a LOS F with long queues forming on Thor, as well as left turn queues on Sprague from west to north.

Since there will be no significant change in the traffic supply functions performed by Thor, Freya, and Sprague or in the intersection design as related to the Market/Greene or Havana alternatives, the projected capacity problems at the Sprague intersection are the same for all alternatives and options. Ordinary intersection improvements, including signalization, channelization and/or extra approach lanes, can not adequately provide a solution.

Although the east-west volumes will increase substantially in the vicinity of the freeway ramps and cause additional congestion at the ramp termini and some adjacent cross-street intersections, the NSF will not have a significant effect on east/west travel conditions between the NSF and Division Street. Travel speeds will not be greatly affected except for slowdowns crossing the NSF in the ramp interchange areas.

Freeway Segment Ramp Description	Volume		Lanes	LOS		Free Flow Speed	Acceleration Length	Ramp Grade
	AM	PM		AM	PM	kph (mph)	meters (feet)	%
I-90 — EB — West of Division[1]	7485	7507	3	F	F	105 (65)		n.a.
I-90 — EB — Off to Division[1]	1906	1297	2	F	F			
I-90 — EB — On from Division	1357	2601	2					
I-90 — EB — Between Division Ramps	6210	5579	3	E	E	105 (65)		n.a.
I-90 — EB — East of Division	6936	8811	5	C	D	105 (65)		n.a.
I-90 — EB — Off to Liberty Park & CD[1]	3597	4434	3	C	D	90 (55)		
Split to Liberty Park	481	415	1	C	C			2.3
Split to C/D EB	3116	4019	3	C	D	90 (55)		-3.5
I-90 —Mainline EB after Liberty Park & C/D off	3339	4377	3	C	D	105 (65)		-0.7
Liberty Park — SB to EB	552	579	1					2.2
3rd Avenue EB	1093	1925	2					2.7
Liberty Park & 3rd Avenue ramps merge	1276	2118	2	C	D			
I-90 —Mainline EB after Liberty Park on	3891	4956	3	C	D	105 (65)		-0.7
C/D — EB beginning of C/D after 3rd Ave. on	4392	6137	4	C	D	90 (55)		-0.7
C/D — EB Off to NSF NB	1794	2245	2	C	D	90 (55)		2.1
C/D — EB after NSF off	2598	3892	3	C	D	90 (55)		0.9
C/D — EB Off to Thor	798	876	1	B	C	70 (45)	253 (830)	-2.1
C/D — EB at Thor	1800	3016	3	B	D	90 (55)		0.0
C/D — EB On From Thor	1231	866	1	B	C	70 (45)	253 (830)	2.4
C/D — EB after Thor on	3031	3882	3	C	D	90 (55)		-0.4
NSF — SB to EB,(before split)	2424	2306	2	D	C	90 (55)		
NSF — SB to EB onto I-90	1212	1153	1	D	E			-2.6
I-90 —Mainline EB After NSF	5103	6109	4	C	D	105 (65)		-0.3
NSF — SB to EB onto C/D	1212	1153	1					-1.8
C/D — EB ending of C /D	4243	5035	4	C	D	90 (55)		-0.3
I-90 — EB — On From C/D	956	1231	1	B	C	90 (55)	253 (830)	-0.3
I-90 —Mainline EB after C/D	6059	7340	4	D	E	105 (65)		2.1
VC — EB — On From C/D	3287	3804	3	C	D	90 (55)		1.9
VC — EB — On From C/D	3287	3804	2	E	E	90 (55)		1.9
I-90 — EB — Off to Broadway	1105	1391	2	D	F			
I-90 — EB — Between Broadway Ramps	5949	4954	3	E	D	105 (65)		
I-90 — EB — On from Broadway	713	1336	1	D	F			
I-90 — EB — East of Broadway	5667	7285	3	E	F			
I-90 — WB — East of Broadway	8048	6752	3	F	F			n.a
I-90 — WB — Off to Broadway	1319	759	2	F	F			-2.1
I-90 — WB — Btwn Brdwy ramps	6729	5993	3	F	E			
I-90 — WB — On from Broadway	1862	1147	2	F	F			
I-90 —WB from Broadway	8591	7140	5	E	F	105 (65)		n.a
I-90 — WB — Off to Sprague	1735	984	1	F	D			-2.5
I-90 — WB — After Off to Sprague	6856	6156	4	D	D			
C/D — WB — On from VC & Fancher	3292	3334	3	D	D	90 (55)		1.0
C/D — WB —On from I-90 WB	2626	2463	2	D	D			0.3
NSF — NB —On from I-90 WB	745	982	1	B	C			2.1
I-90 — WB after NSF off	3485	2711	3	C	B	105 (65)		2.1
C/D — WB beginning of C/D	5918	5797	4	D	D	90 (55)		0.3
C/D — WB — Off to Thor & NSF	1556	2367	2	B	C	90 (55)		-3.4
C/D — WB after NSF off	4362	3430	3	D	C	90 (55)		0.4
C/D — WB On From Thor	646	766	1	C	C	70 (45)	253 (830)	2.1
C/D — WB West of Thor	5008	4196	3	E	D			-0.9
NSF — SB —WB	1833	1272	2	C	C	90 (55)		-1.9
Split to I-90 WB	1034	718	1	C	C	90 (55)	253 (830)	-3.7
Split to C/D — WB	799	554	1			90 (55)	256 (840)	-1.9
I-90 — WB after NSF on	4519	3429	3	D	C	105 (65)		n.a.
C/D — WB after NSF on	5807	4750	4	D	C	90 (55)		-0.9
C/D — WB — Off to 2nd Ave.	1292	888	1	B	A			-1.4
C/D — WB — After Off to 2nd Ave.	4515	3862	4	C	D			
Liberty Park — NB —On from C/D	1239	833	2			90 (55)		3.8
I-90 — WB — On from C/D	3029	3276	2	D	E	90 (55)		-1.0
I-90 — WB after C/D	7795	6458	4	E	D	105 (65)		2.3
I-90 — WB — On from Liberty Park	384	457	2	B	B	90 (55)	670 (2200)	1.0
I-90 — WB — West of Liberty Park	8179	6915	5	E	D	105 (65)		2.3
I-90 — WB — Off to Division[1]	1678	553	2					
I-90 — WB — On from Division[1]	637	1150	1	F	F			
I-90 — WB — West of Division[1]	7138	7512	3	F	F			

Note 1: Appendix B contains a weave analysis for this ramp/segment.

Operational Analysis Factors Applied
Volumes are from SRTC modeling.
Peak-Hour Factor of 0.95
Trucks on system, used 9%
Recreational Vehicles, 0.0%
Driver Population Factor of 1.00

2020 Operation of I-90 - C/D System
Table 7

4. Access Connections and Design

The I-90 corridor consists of two major elements;

- The I-90 Collector Distributor (C/D) System.
- The North Spokane Freeway (NSF) Interchange.

Both elements are discussed separately within this section.

The C/D System consists of two elements;

- Mainline, consisting of lanes presently in use on I-90
- Collector Distributor lanes.

The Mainline would accommodate through-traffic. The C/D lanes would handle traffic movement to and from the project corridor. Access would be provided to and from local arterials, existing interchanges, or the NSF Interchange by use of the C/D.

The NSF Interchange is discussed in this report as a separate element for reasons of clarity. It should be understood that the C/D system and the NSF Interchange are two closely related systems. For the I-90 corridor to transfer local, regional and NSF traffic in an efficient manner, a C/D system is vital. Although the I-90 project corridor would function without a C/D system, its level of service and longevity would be markedly decreased.

Mainline

I-90 currently has three lanes in each direction of travel along the study corridor. After construction of the NSF Interchange, these lanes will become express type lanes, allowing limited on or off access between Liberty Park and Sprague Ave. Interchanges. Eastbound and westbound ramps from the NSF will be adjacent to the outside lane of the mainline I-90 and will be at the same elevation near each end of the C/D.

The existing 3.0 meter (10 foot) median will be widened to 6.7 meters (22 feet), consisting of 3.0 meter (10 foot) shoulders and a 0.6 meter (2 foot) concrete median barrier strip, to meet current design standards. Travel lanes would be 3.7 meter (12 feet) wide. Outside the shoulder/median would consist of a 3.0 meter (10 foot) shoulder and a 1.8 meter (6 foot) drainage and concrete median barrier strip.

Mass Transit (HOV)

There are no special provisions for mass transit or High Occupancy Vehicle (HOV) lanes on the mainline system through Spokane. As HOV or mass transit systems are developed they can be accommodated on the C/D. See the section on HOV Facility.

Access Control

To enter or exit I-90, traffic from local arterials will utilize the newly constructed C/D. An additional lane on the outside of the mainline is dedicated to the NSF in the westbound direction. The existing mainline lanes will be used exclusively for east and westbound through-traffic on I-90. The split ramps from the NSF add an outside auxiliary lane in both directions to the mainline; however, the ramps run above the mainline until near the end of the C/D. Because of the "expressway"

nature of the mainline portion of I-90, access to and from the I-90 mainline will no longer be available from the Liberty Park, Sprague Ave., or Thor/Freya interchanges. All traffic, entering or leaving I-90 from these areas, must travel the length of the C/D to access I-90 for destinations outside of the project corridor. Similarly, traffic within the mainline portion of the project corridor will be unable to access the interchanges listed above, and must travel outside of the project corridor to exit I-90.

Cross-facility access will remain the same. These cross-facility access points are as follows:

1) Perry Street Tunnel Overcrossing
2) Altamont Street Overcrossing
3) Thor/Freya Streets Undercrossing
4) Havana Street Overcrossing

Collector Distributor (C/D) System

The I-90 Collector Distributor (C/D) system corridor begins near Liberty Park Interchange, running parallel to I-90 in an east-west direction. This alternative maintains this orientation until Sprague Ave. Interchange, where the C/D system ends. The entire C/D system lies between these interchanges and is approximately 4.8 kilometers (3 miles) in length.

The C/D system will consist of three 3.7 meter (12 foot) lanes and an auxiliary lane in each direction of travel. The auxiliary lanes become general purpose lanes as ramps from the NSF transition into the C/D on both sides of the interchange. The median area between the C/D and mainline lanes will consist of a 3.0 meter (10 foot) shoulder, and a 1.8 meter (6 foot) drainage and concrete median barrier strip. There will also be an additional 3.7 meter (12 foot) area for future lane expansion in each direction of travel. Interchange ramps will provide 4.6 meter (15 foot) lanes with 2.4 meter (8 foot) outside and 0.6 meter (2 foot) inside shoulders with concrete barrier guardrails.

Mass Transit, (HOV)

A 3.7 meter (12 foot) strip located within the median has been provided to be available for use as a mass transit lane if a future need is identified.

Access Control

Access control to or from the C/D will be made only at ramp terminals at all interchanges by use of signalized intersections or free-flow movements from the interchange arterial. As discussed in the previous section, access to I-90 will be by way of the C/D only. Limited access will be allowed to the mainline portion of I-90 within the project corridor. Access to and from the C/D will be made from the following interchanges:

1) Liberty Park (eastbound only)
2) North Spokane Freeway
3) Thor/Freya
4) Sprague (westbound only)

Interchange

The I-90 Interchange is located west of the Thor/Freya Interchange at the point where Greene Street intersects with I-90. The alternatives begin at a common point at the north end of the NSF Interchange where the east and westbound ramps converge. This would mark the end of the interchange and the beginning of the viaduct sections for each alternative. Beginning at the centerline of I-90, the interchange runs approximately 1370 meters (4500 feet) north to its end as described above. This interchange will collect east/west traffic from the C/D and transfer it onto the NSF.

Most ramps on the interchange will consist of two, 4.6 meter (15 foot) lanes, with the exception of split ramps from westbound I-90 to the NSF and from the NSF to east and west bound I-90. Two lane ramps will provide 2.4 meter (8 foot) outside and 0.6 meter (2 foot) inside shoulders. Single lane ramps will provide 2.4 meter (8 foot) outside and 0.6 meter (2 foot) inside shoulders. All ramps will provide 4.6 meter (15 foot) lanes.

Access Control

Access to and from the interchange area will only be from the NSF southbound and the C/D east and westbound to northbound. Access across the facility will be made on major arterials as they presently exist. Side streets located under the interchange that will no longer be in use, will be demolished.

Weave Distances

The NSF Interchange with I-90 plans for use of three split ramps. Two of these split ramps, one eastbound and one westbound, provide for traffic exiting the NSF to travel either the I-90 mainline or on the C/D. The other split-ramp allows westbound C/D traffic to access either the NSF or Thor Street. Table-7 contains weave distances for the C/D and parallel segments of I-90.

5. Land Use and Transportation Plans

Spokane County:

Comprehensive Plan

The Spokane County 1990 Comprehensive Plan was adopted by the Board of County Commissioners in December of 1990. The Comprehensive Plan includes two legally required elements, land use and circulation. The land use element attempts to promote compatibility between land uses, and to serve as a guide for county growth. The circulation element, which includes traffic, mass transit, sewer, and water plans, provides a means of coordinating county programs and services with land use needs and future growth. The development of the Comprehensive Plan is a continuous process with amendments and updates as needed. Goals and objectives of the Comprehensive Plan focus on an orderly pattern of growth between developed and undeveloped areas and the promotion of commercial and industrial development that is complementary to, and compatible with, adjacent land uses, as well as the surrounding environment. (See General Land Use Maps, Figures 2, 3 and 4).

The Spokane County Comprehensive Plan also addresses the need for a north/south controlled access facility. No specific routes were identified; however, the following criteria were recommended in choosing a route:

- Linkage between I-90 and U.S. 195 and U.S. 395.
- Solutions must be interconnected with solving the north/south to Valley problems.
- North side traffic solutions should consider solutions which address connections to the south side of the City and Moran Prairie.
- The Spokane Regional Transportation Council (SRTC) studies show that a controlled access north/south facility will be needed in the next 15 years.

The Comprehensive Plan designates the area in the quadrant northeast of the City as semi-rural east of Freya Street between Lyons and Gerlach Roads, rural between Gerlach and Fairview Road, industrial west of Fairview Road to SR 2, and urban to U.S. 395.

City of Spokane:

The following plans were reviewed:

City of Spokane Land Use Plan

The Land Use Plan for the City of Spokane was adopted by the City Council in 1983. Some of the major issues and concerns for the City of Spokane include how to maintain the central business district, how to inhibit the continuation of urban sprawl, and how adequate transportation systems can be provided without disrupting neighborhoods. The protection of the natural environment by controlling the adverse impacts of growth and development is also encouraged. (See Generalized Land Use Maps, Figures 2, 3 and 4).

City of Spokane Arterial Street Plan

The City of Spokane Arterial Street Plan was adopted by the City Council in 1986. Its purpose is to address arterial street development over the next 20 to 30 years while being responsive to the demands of the future and providing protection for the environment and the City's quality of life. One of their long term improvements is a controlled access arterial in the Hillyard Railroad route to be completed in 10 to 20 years. The limited access facility would relieve congestion on Division and other north/south arterials. It would also provide easy access to I-90 from the north, prevent the further intrusion of arterial traffic into residential neighborhoods, and relieve neighborhoods of some existing traffic.

Neighborhood Plans

The City of Spokane has a neighborhood planning process as part of the Comprehensive Plan development. Community task forces, assisted by city staff, develop specific neighborhood land use goals, policies, and maps. Plans include such elements as land use, circulation, recreation, and community facilities. Plans are adopted for the East Central, Chief Garry Park, and Hillyard neighborhoods.

East Central Neighborhood Design Plan

The East Central Neighborhood Design Plan, adopted in 1986, does not specifically address the issue of the North Spokane Freeway(NSF) or the I-90 Collector Distributor (C/D) System. The encouragement of efficient through traffic movement by improving the traffic-carrying capabilities of existing major arterials is one of the neighborhood's policies. The residential goal is to "encourage the development and preservation of quality housing with a mix of unit type, density and cost." Pursuant to this goal are policies for low, medium and high density housing which are articulated on the land use map. Low Density Residential use is designated on the south side of I-90 from Liberty Park to Freya, and on both sides of I-90 east of Freya Street to Havana Street. Medium Density Residential is designated on the north side of I-90 to Thor, and south of I-90 between Stone and Smith streets. A node of High Density Residential is bounded by Thor on the west, Freya on the east, I-90 on the south and Pacific on the north. General commercial is designated in a strip north of Pacific to the north side of Sprague Ave., with heavy industrial north to Trent Ave. A community business node is north of Pacific, between Myrtle and Havana.

Chief Garry Park Neighborhood Specific Plan

The Chief Garry Park Neighborhood Specific Plan, approved by the City Council in January 1991, states as one of its transportation goals, the need to provide a circulation system which moves traffic efficiently, restricts truck traffic to commercial/industrial areas, and promotes the safety and enjoyment of residents. Policy 3 states: "Support the construction of a North-South freeway along the Freya-Greene corridor". Under discussion the plan states:

> The Chief Garry Park neighborhood does not oppose the Freya-Greene-Market route as it would have minimal impact on the residential portions of the neighborhood. It is possible that an elevated viaduct may be utilized from the Freya overpass north to Hillyard. An off-ramp into the neighborhood at either Trent Ave. or Mission Ave. may also be provided.

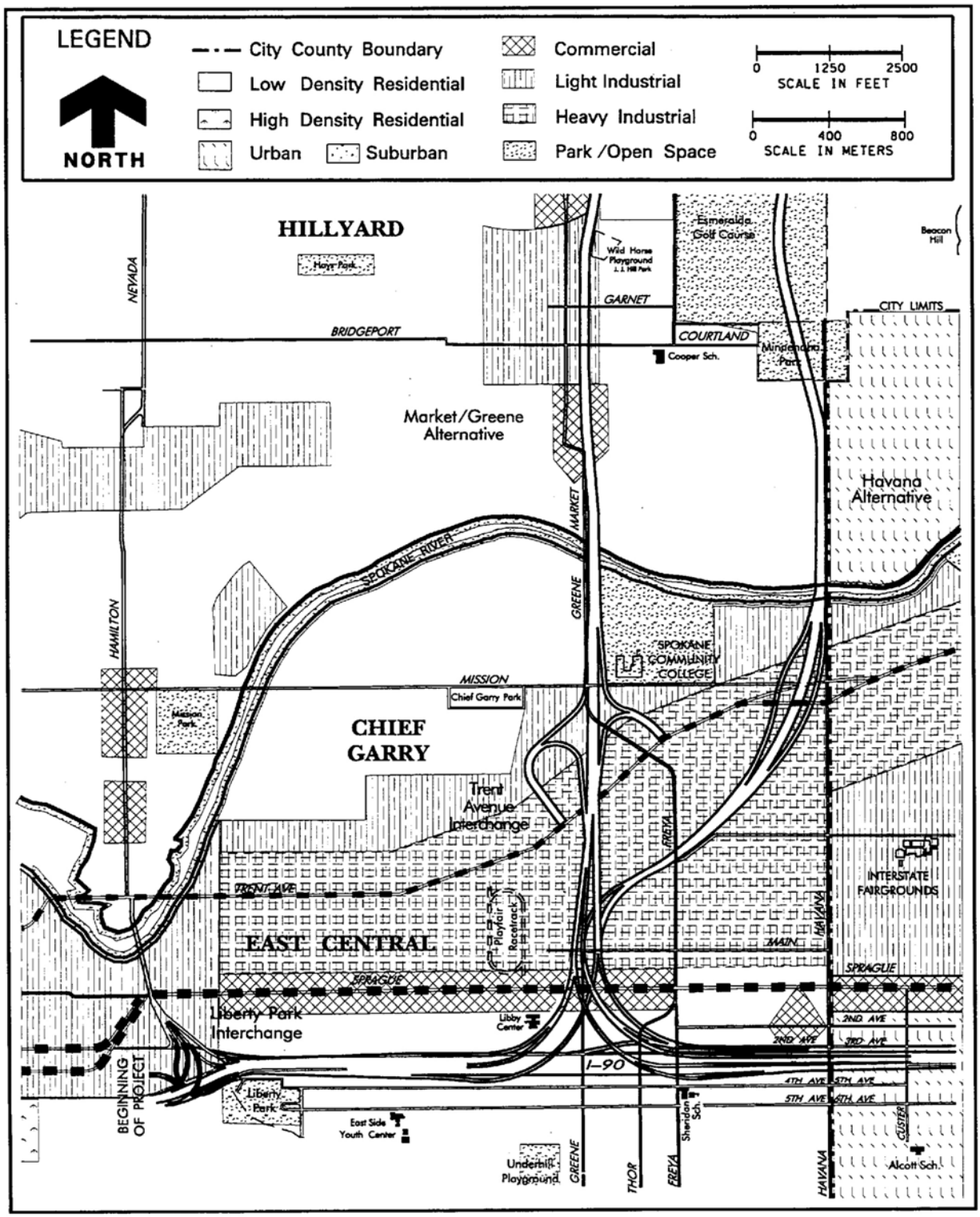
The Neighborhood plan states the need for a buffer zone to the west of Greene Street between the arterial and the single family residential neighborhood. The plan map indicates duplexes along Mission Avenue and Greene Street to a depth of two lots. The area west of this strip is designated for single-family residential. Medium density residential is designated along the south bank of the river west of Greene Street. The route would pass through the west side of Spokane Community College's parking lot. The College currently has no adopted campus plan. The neighborhood plan designates the campus for public use. Finally, the plan designates the land south of Mission Ave. for light industrial use.

Hillyard Neighborhood Design Plan

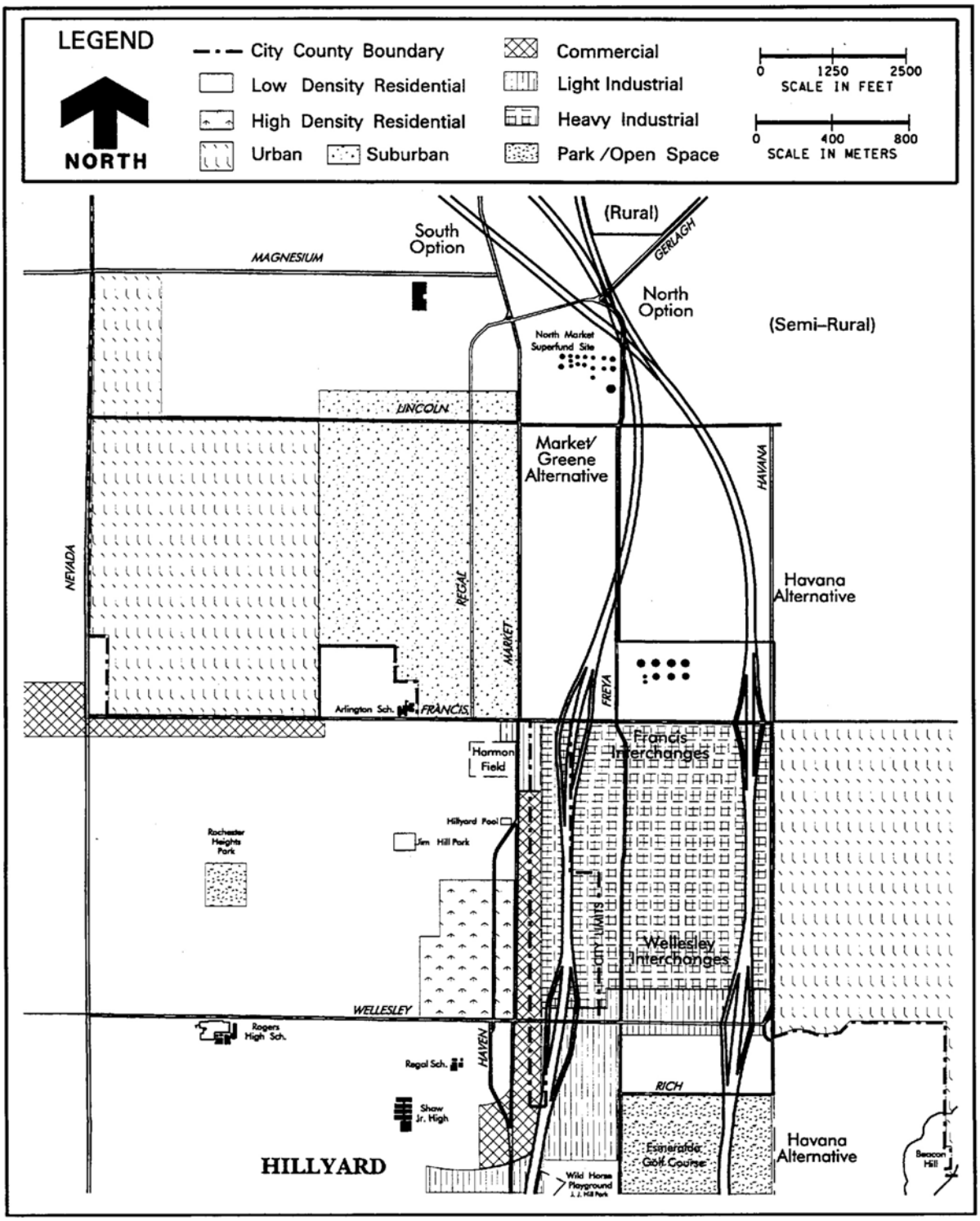
The Hillyard Neighborhood Design Plan, adopted by the City Council in 1985, in its Circulation Element, expressed the need for improved north/south access. The plan recommends the Greene Street route if the proposed NSF development occurs. Land uses to the east of the Greene Street route are primarily designated as industrial north of Garland Avenue and low density residential to the south. To the west of the route the plan designates land as general business, light industrial with a small section of medium density residential along the river. The plan states that the Greene Street route would divert traffic from Market Street, provide access to facilitate development of undeveloped industrial land east of Market, and act as a catalyst for redevelopment of the Hillyard Business District. Suggested criteria for the development of the freeway are below grade construction, heavy planting and sound barriers, adequate connections between east and west Hillyard, and interchanges at Francis, Wellesley, and Illinois/Euclid. The neighborhood is concerned about maintaining and strengthening existing low density residential areas while promoting diversity in business and industrial development at appropriate locations in the neighborhood.

The NSF project is consistent with the above mentioned land use plans in that it provides the high capacity limited access transportation system that many of the plans support. The majority of these plans describe a need for a system that would relieve the current and projected congestion of the north/south arterials in a safe and efficient manner. The NSF project provides this need.

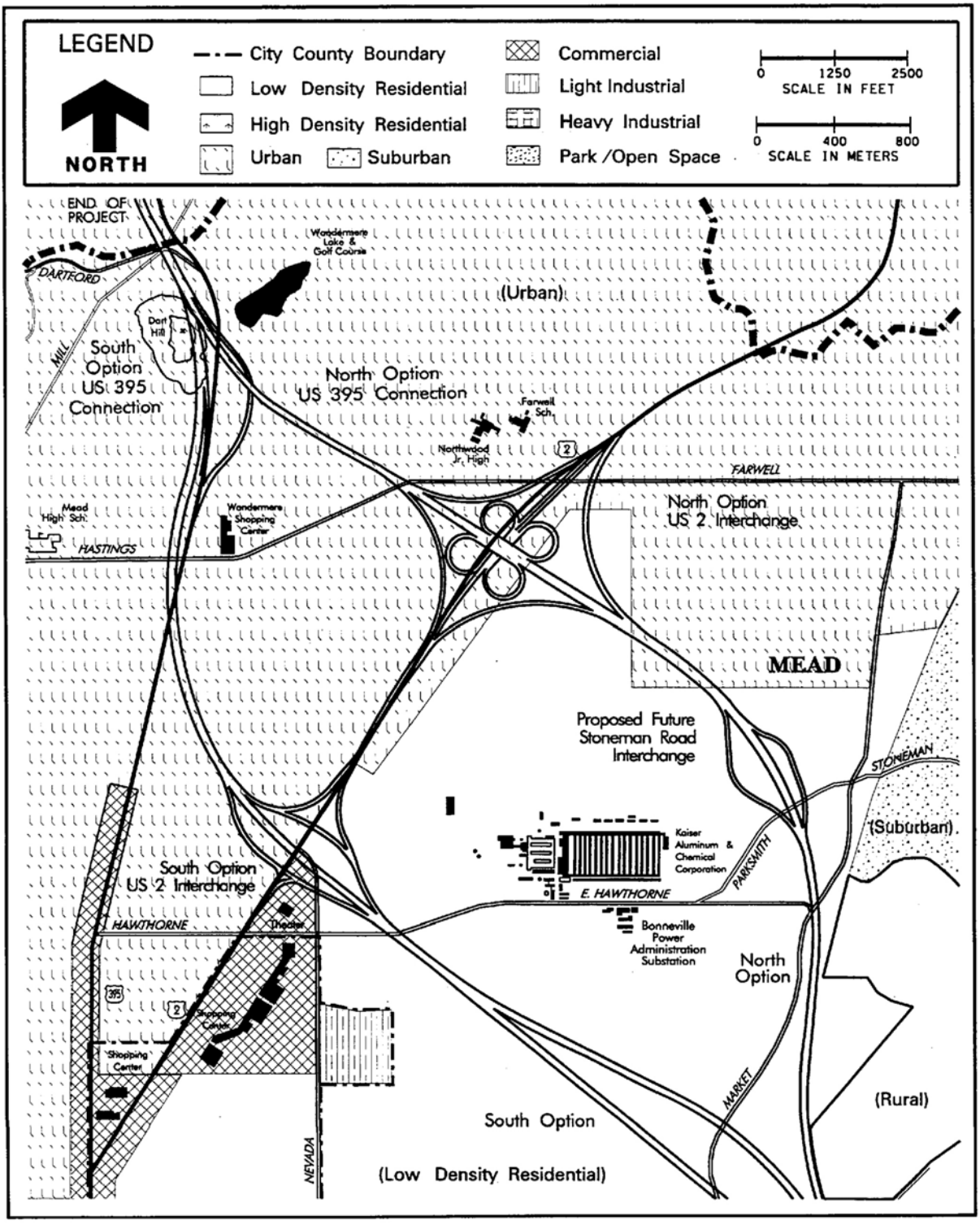
The neighborhood character along the C/D corridor has already been considerably influenced by the noise, air quality, and aesthetic impacts of I-90. The northern portion of the neighborhood is isolated from the southern portion and consists of a one to two block-wide strip bracketed by the Sprague Ave. business corridor I-90. The project would further narrow the neighborhood strip north of I-90 and shift vehicular-related air and noise impacts into areas not now exposed to them. These impacts, while not causing land use changes themselves, would add to other influences that could adversely affect neighborhood stability and quality in the area north of I-90.



General Land Use — Area 1
Figure 2



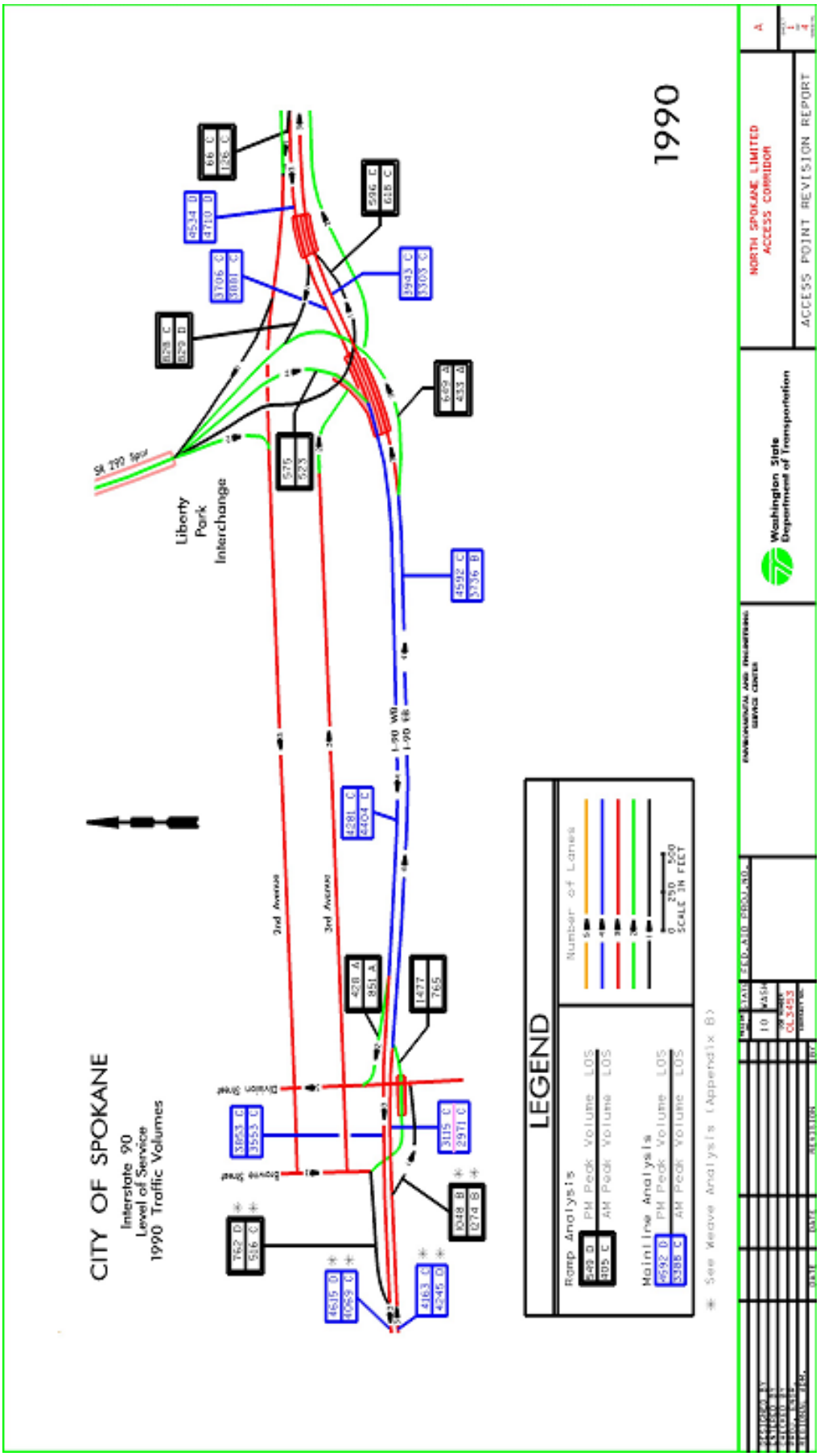
General Land Use — Area 2
Figure 3

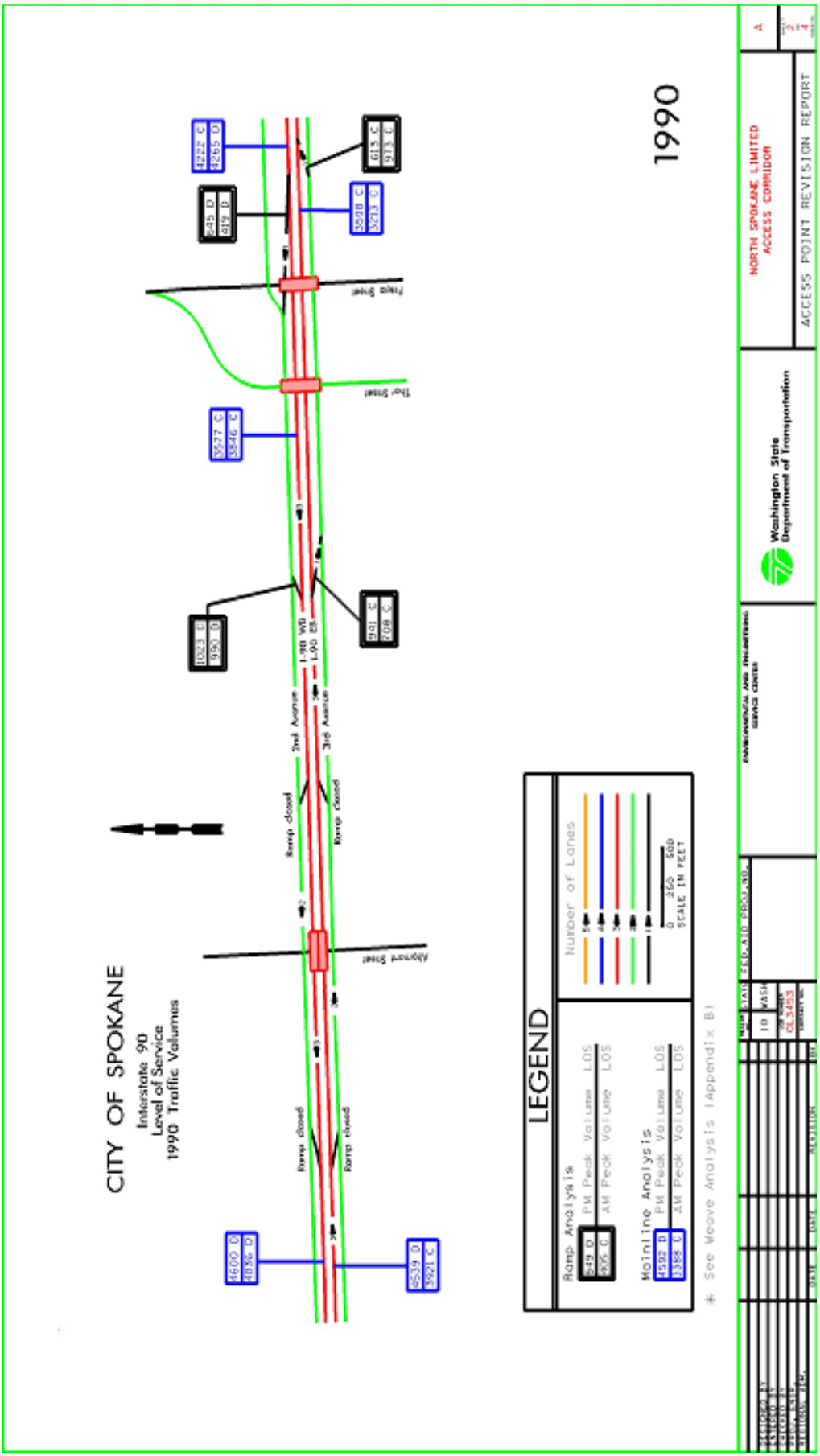


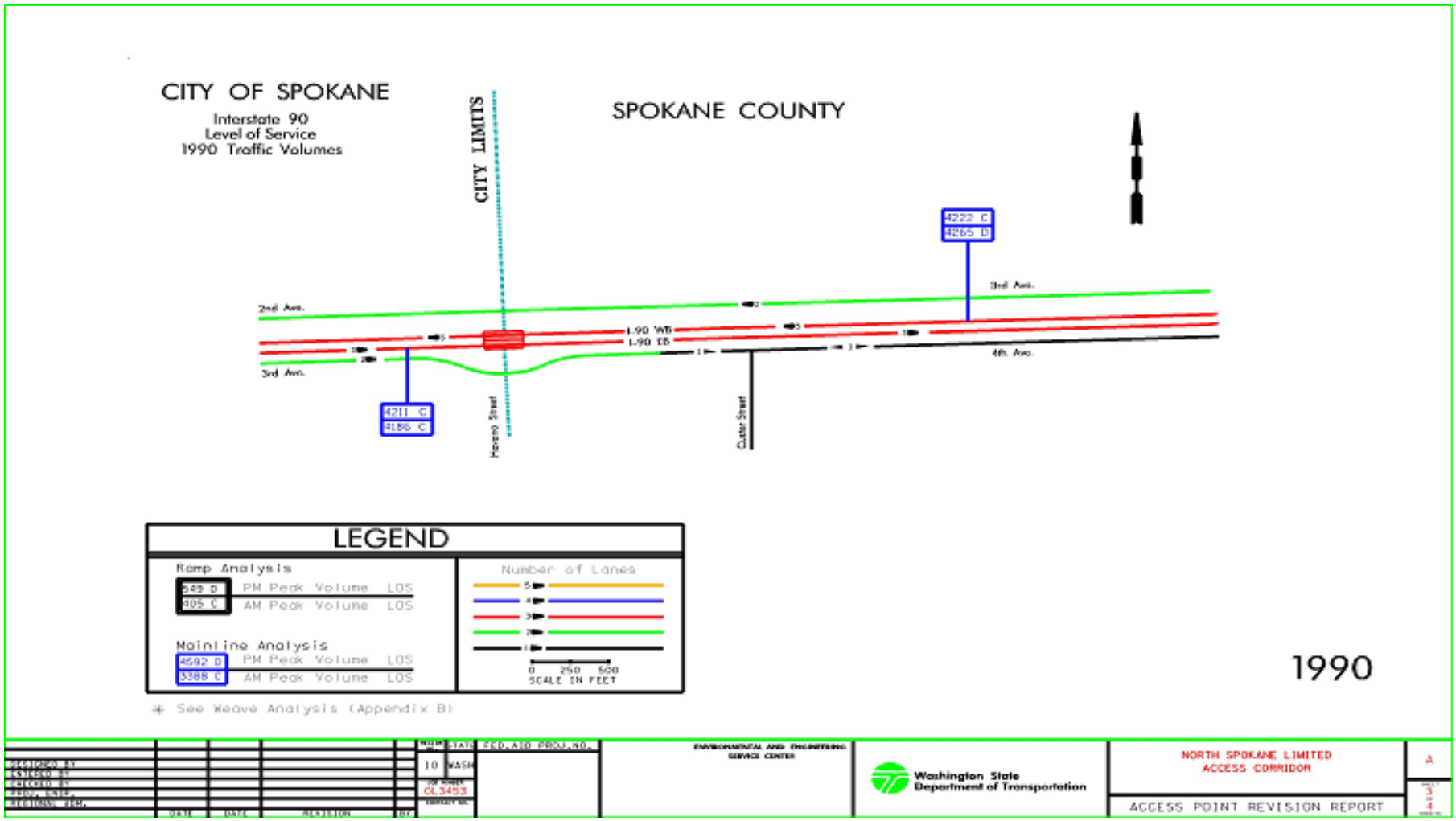
General Land Use — Area 3
Figure 4

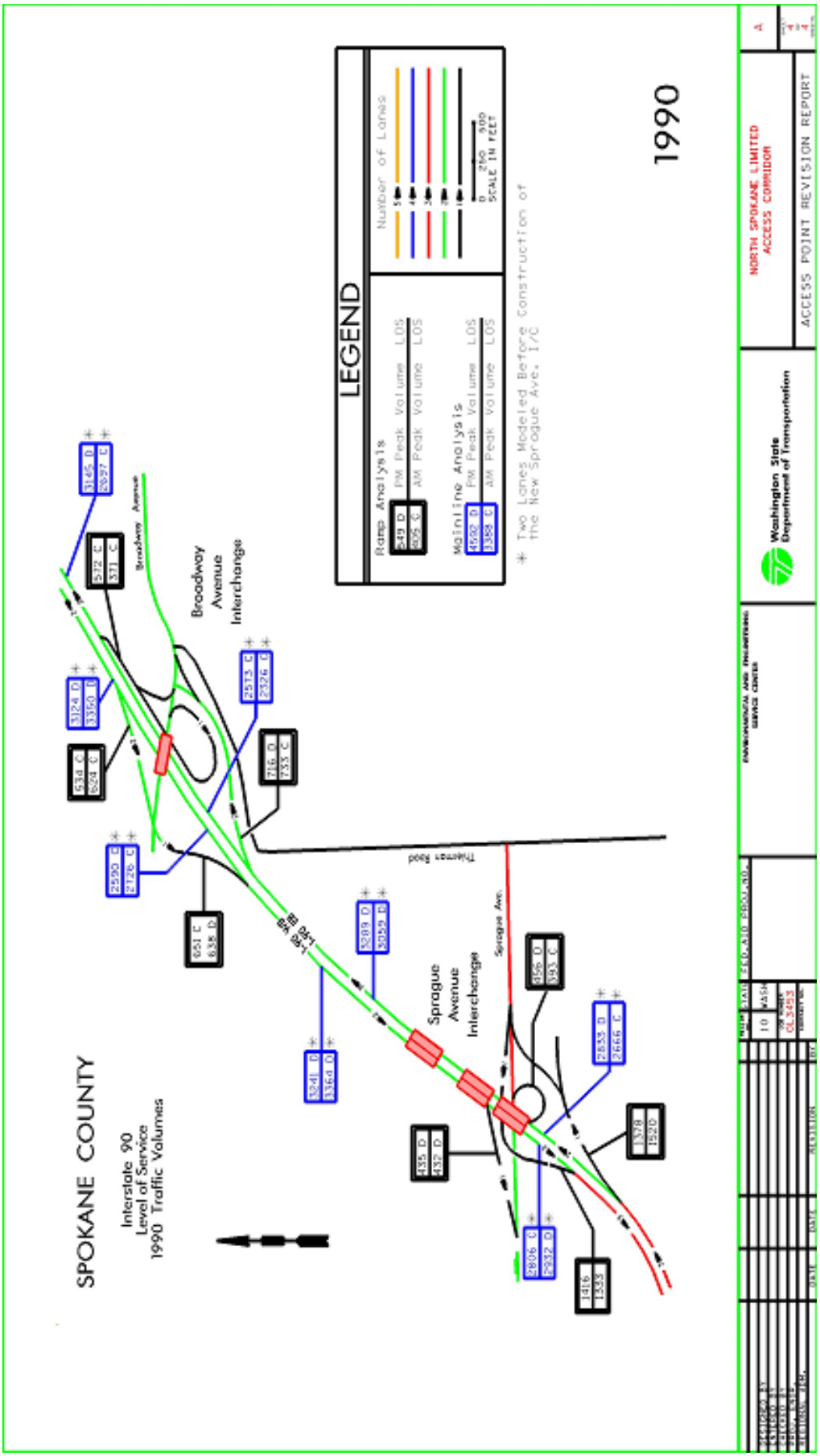
APPENDIX A

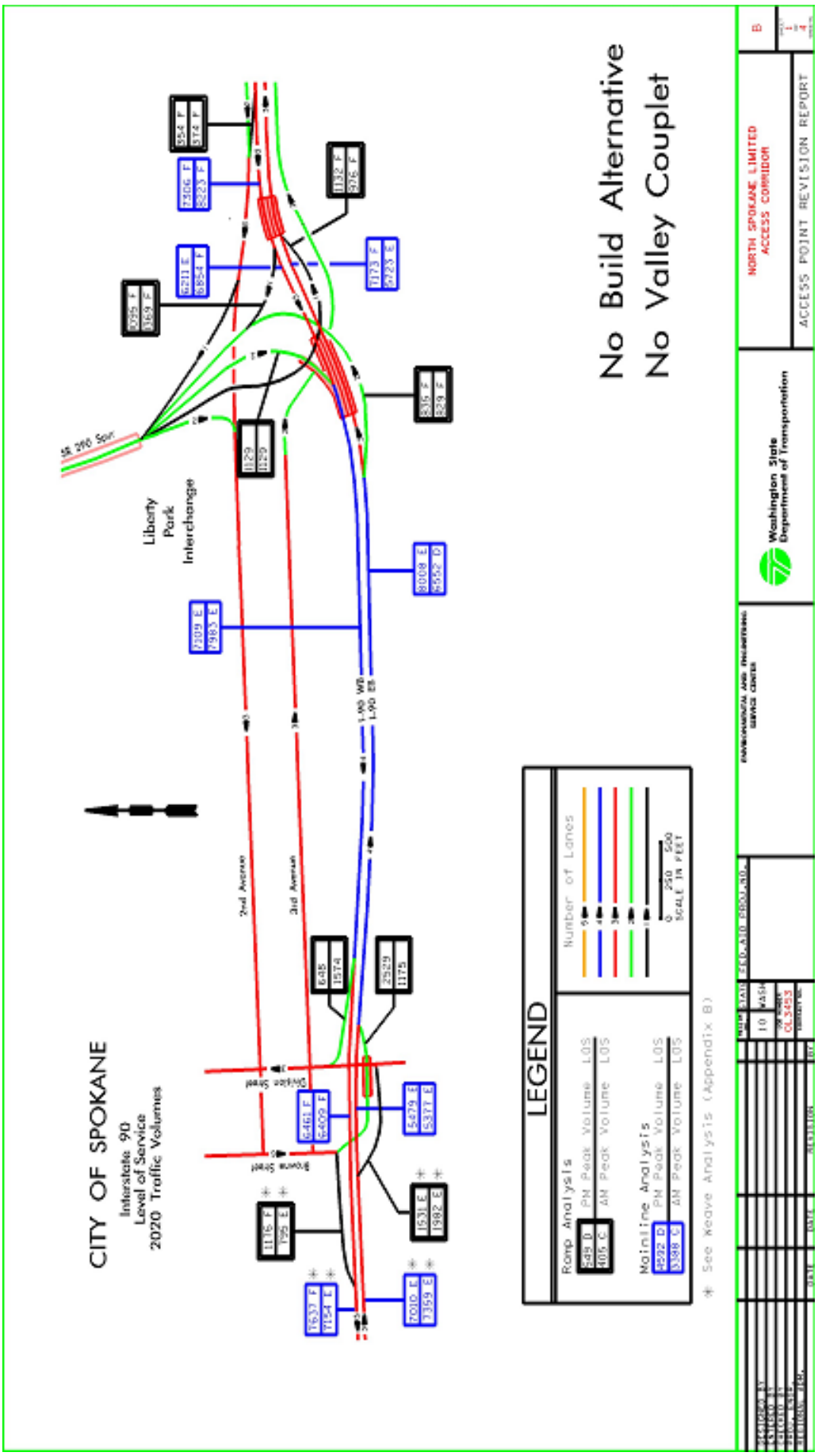
ALTERNATIVES:
AM/PM PEAK VOLUMES & LOS

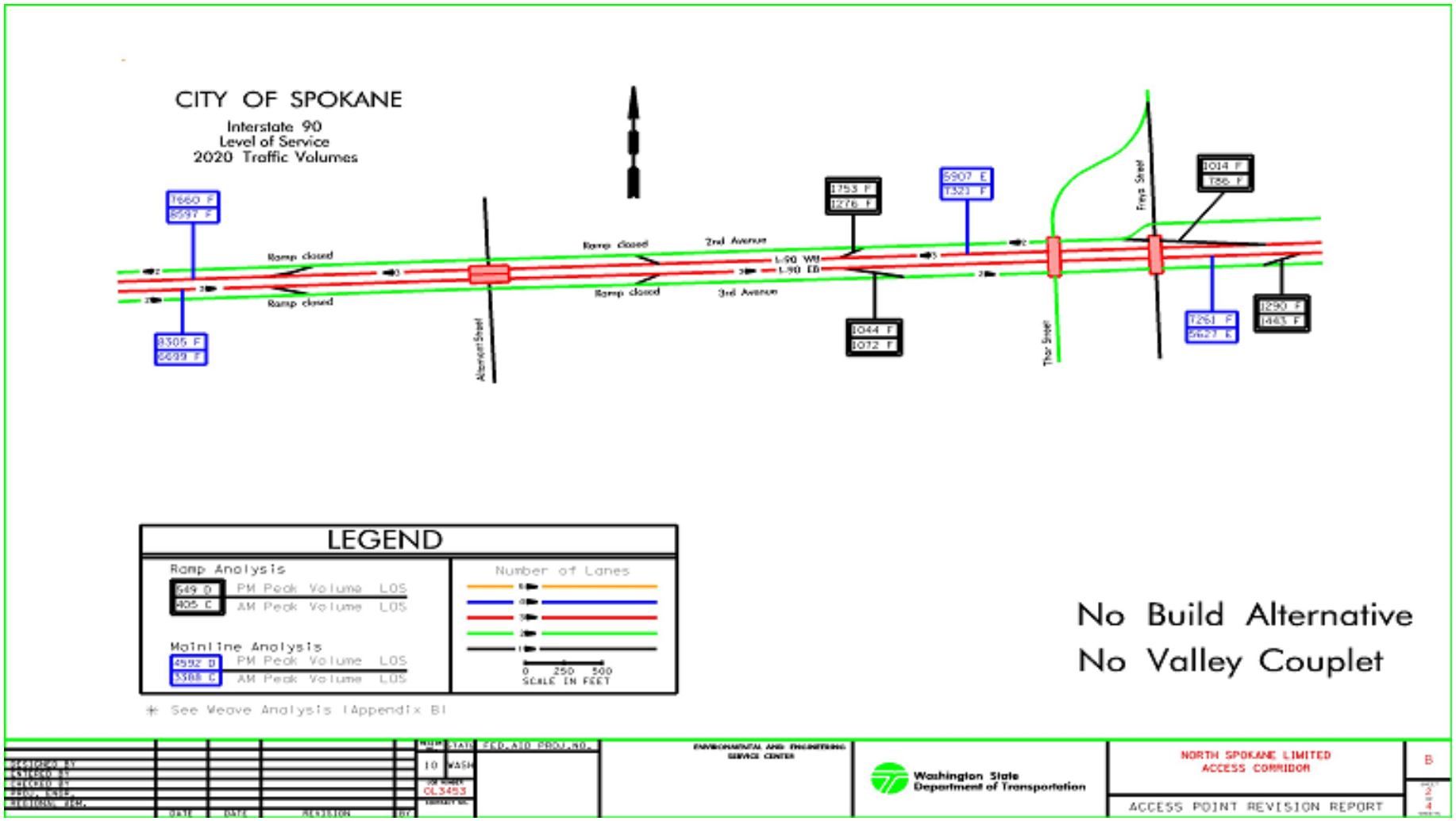

1990
CITY OF SPOKANE
Interstate 90
Level of Service
1990 Traffic Volumes
Liberty
Park
Interchange
LEGEND
Ramp Analysis
PM Peak Volume LOS
AM Peak Volume LOS
Mainline Analysis
PM Peak Volume LOS
AM Peak Volume LOS
Number of Lanes
SCALE IN FEET
* See Weave Analysis (Appendix B)
NORTH SPOKANE LIMITED ACCESS CORRIDOR
ACCESS POINT REVISION REPORT
Washington State Department of Transportation

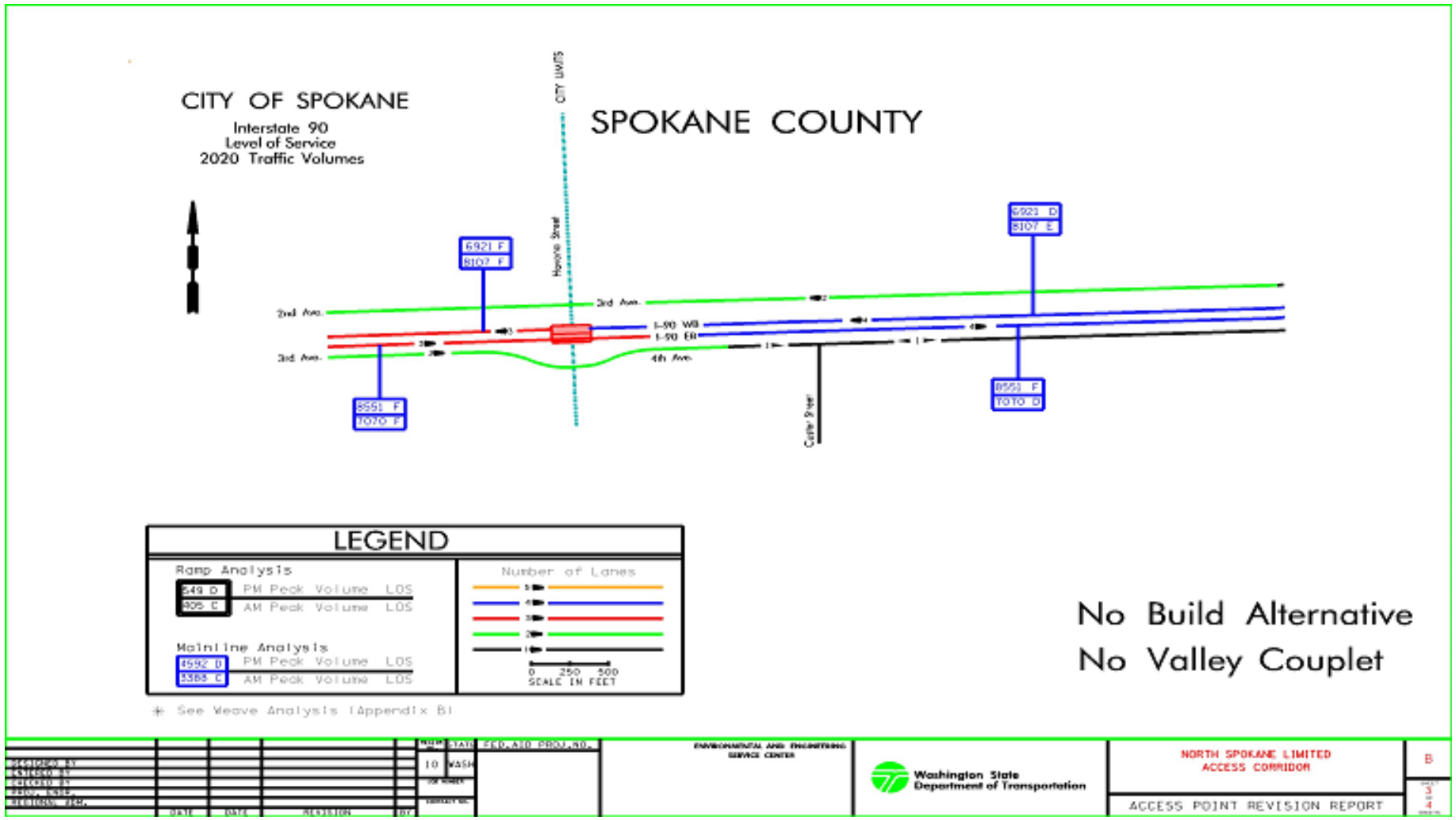

1990
CITY OF SPOKANE
Interstate 90
Level of Service
1990 Traffic Volumes
LEGEND
Ramp Analysis
PM Peak Volume LOS
AM Peak Volume LOS
Mainline Analysis
PM Peak Volume LOS
AM Peak Volume LOS
Number of Lanes
SCALE IN FEET
* See Weave Analysis (Appendix B)
Ramp closed
Ramp closed
Ramp closed
Ramp closed
2nd Avenue
3rd Avenue
I-90 WB
I-90 EB
Thor Street
Altamont Street
NORTH SPOKANE LIMITED ACCESS CORRIDOR
ACCESS POINT REVISION REPORT
Washington State Department of Transportation

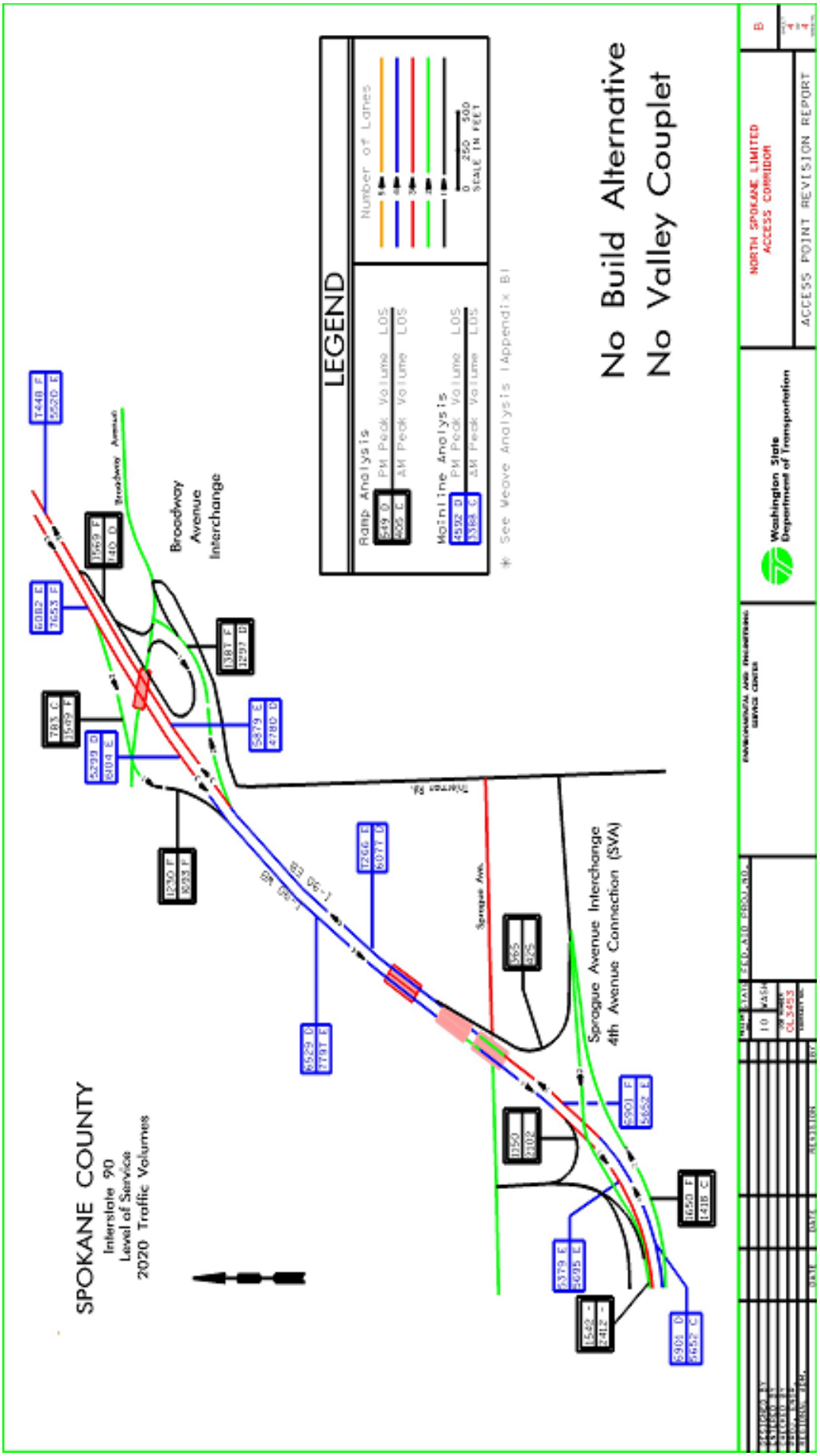

CITY OF SPOKANE
Interstate 90
Level of Service
1990 Traffic Volumes
CITY LIMITS
SPOKANE COUNTY
4222 C
4265 D
2nd Ave.
3rd Ave.
I-90 WB
I-90 EB
3rd Ave.
4th Ave.
4211 C
4186 C
Havana Street
Custer Street
LEGEND
Ramp Analysis
549 D PM Peak Volume LOS
405 C AM Peak Volume LOS
Mainline Analysis
4592 D PM Peak Volume LOS
3388 C AM Peak Volume LOS
Number of Lanes
0 250 500
SCALE IN FEET
1990
* See Weave Analysis (Appendix B)
10 WASH
CL3453
FED. AID PROJ. NO.
ENVIRONMENTAL AND ENGINEERING SERVICE CENTER
Washington State Department of Transportation
NORTH SPOKANE LIMITED ACCESS CORRIDOR
ACCESS POINT REVISION REPORT
A

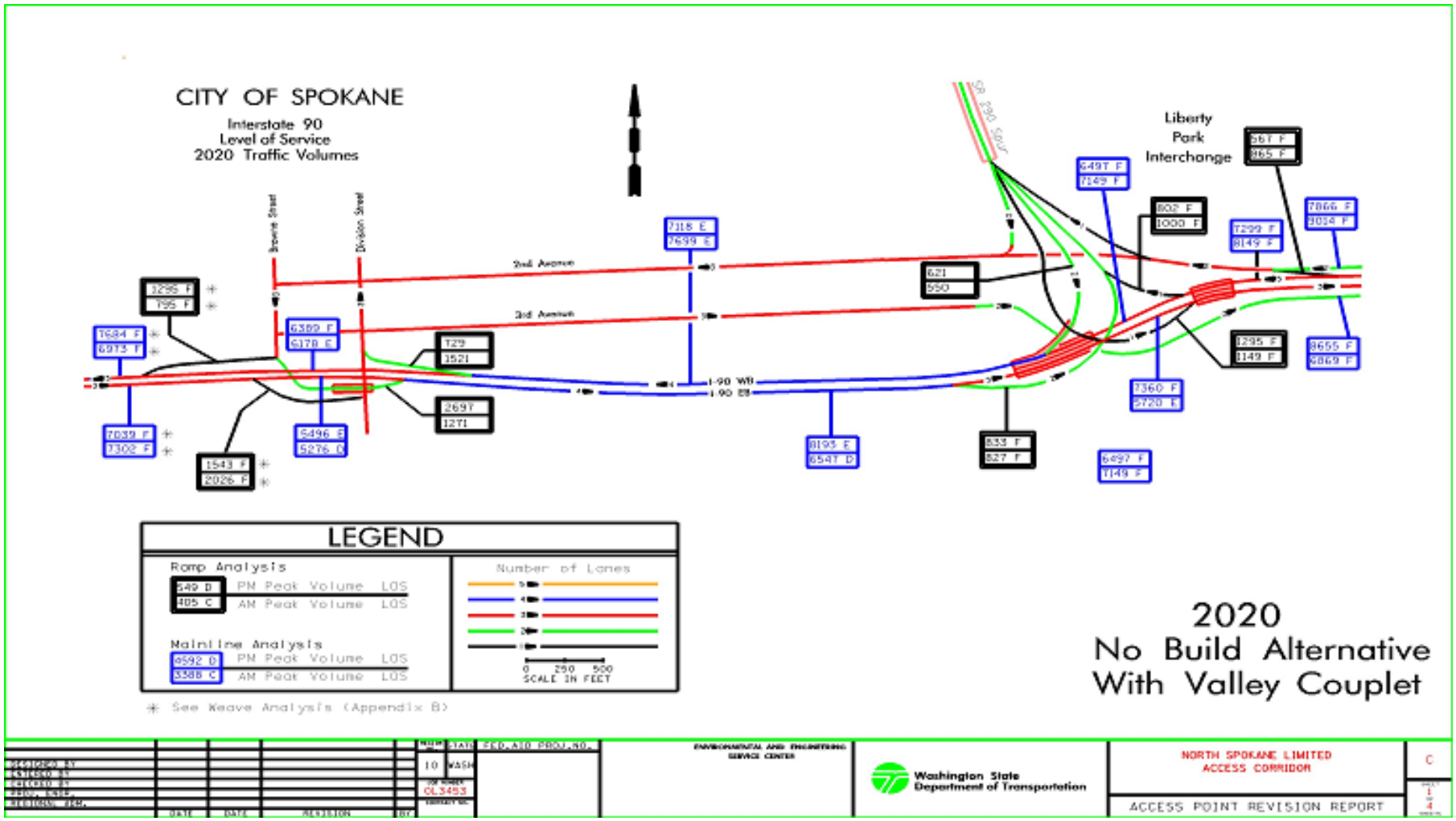

1990
LEGEND
Ramp Analysis
PM Peak Volume LOS
AM Peak Volume LOS
Mainline Analysis
PM Peak Volume LOS
AM Peak Volume LOS
Number of Lanes
SCALE IN FEET
* Two Lanes Modeled Before Construction of the New Sprague Ave. I/C
SPOKANE COUNTY
Interstate 90
Level of Service
1990 Traffic Volumes
Broadway Avenue Interchange
Sprague Avenue Interchange
Thierman Road
Sprague Ave.
NORTH SPOKANE LIMITED ACCESS COMMIDOR
ACCESS POINT REVISION REPORT
Washington State Department of Transportation

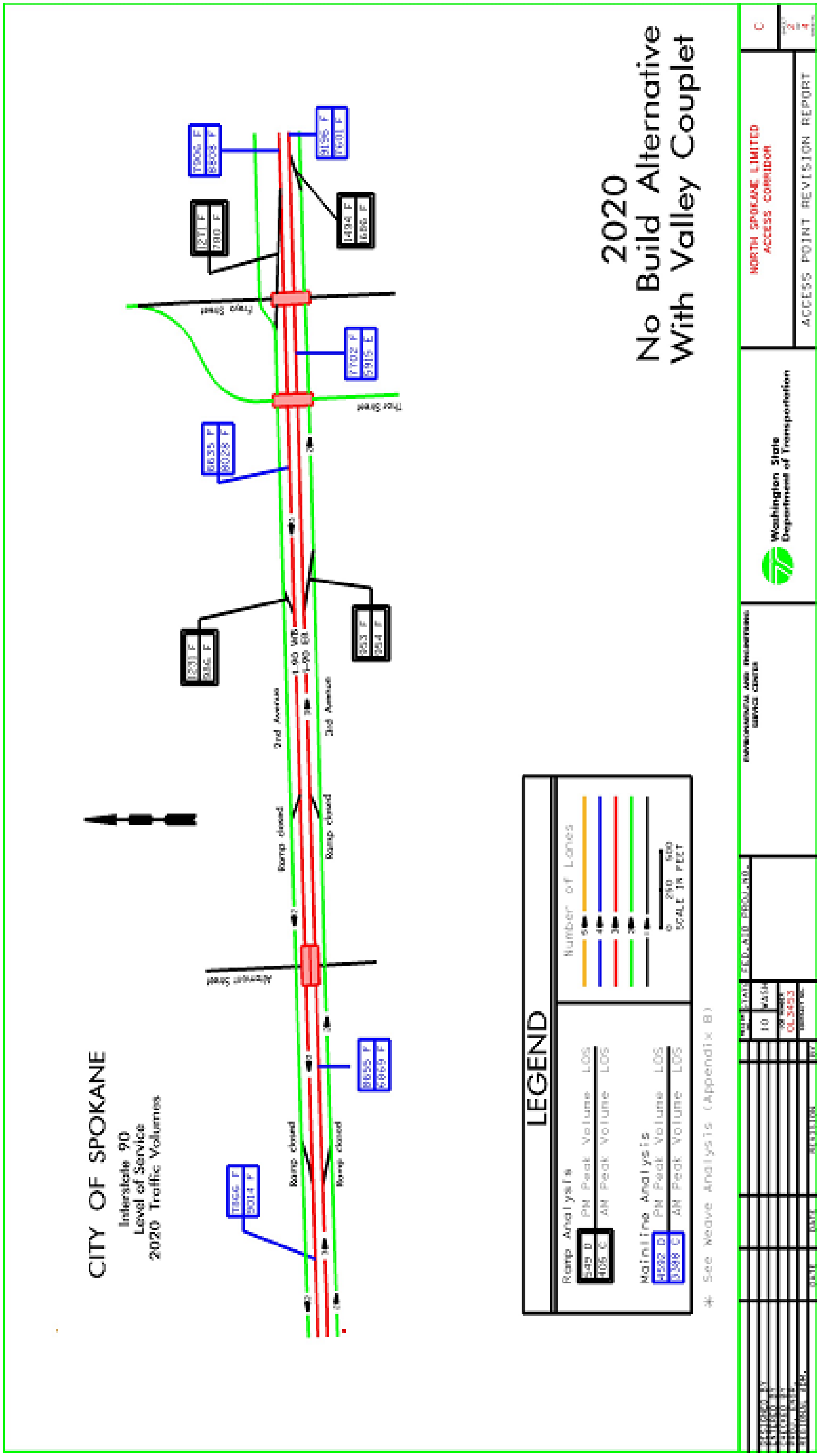

No Build Alternative
No Valley Couplet
CITY OF SPOKANE
Interstate 90
Level of Service
2020 Traffic Volumes
Liberty Park Interchange
LEGEND
Ramp Analysis
PM Peak Volume LOS
AM Peak Volume LOS
Mainline Analysis
PM Peak Volume LOS
AM Peak Volume LOS
Number of Lanes
SCALE IN FEET
* See Weave Analysis (Appendix B)
Washington State Department of Transportation
NORTH SPOKANE LIMITED ACCESS COMMIDOR
ACCESS POINT REVISION REPORT

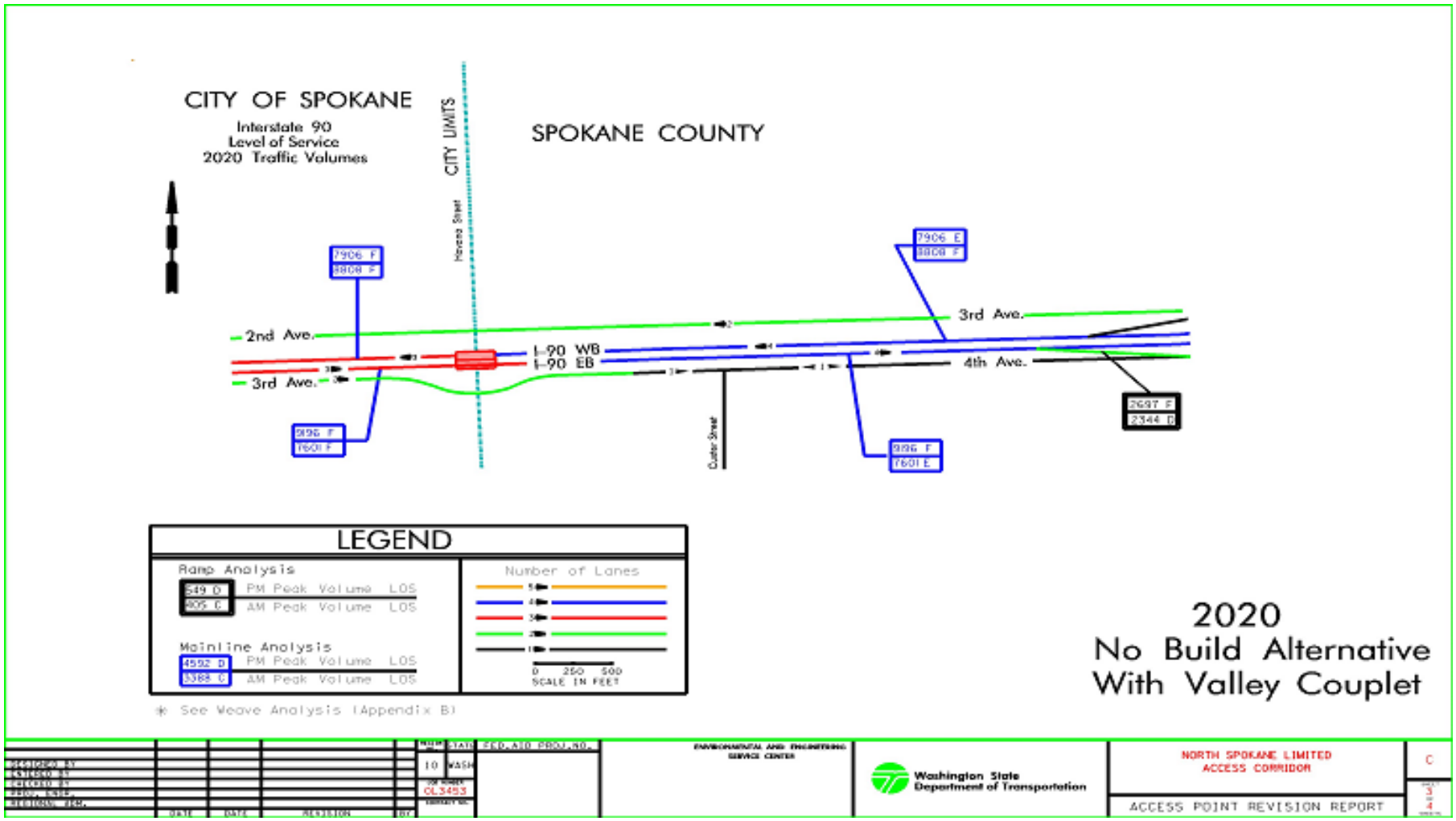

CITY OF SPOKANE
Interstate 90
Level of Service
2020 Traffic Volumes
7660 F
8597 F
8305 F
8699 F
Ramp closed
Ramp closed
Ramp closed
Ramp closed
2nd Avenue
3rd Avenue
I-90 WB
I-90 EB
Altamont Street
1753 F
1276 F
1044 F
1072 F
5907 E
1593 F
Thor Street
Freya Street
1014 F
786 F
1261 F
1290 F
1446 F
LEGEND
Ramp Analysis
649 D
405 C
PM Peak Volume LOS
AM Peak Volume LOS
Mainline Analysis
4592 D
3368 C
PM Peak Volume LOS
AM Peak Volume LOS
Number of Lanes
0 250 500
SCALE IN FEET
See Weave Analysis (Appendix B)
No Build Alternative
No Valley Couplet
ENVIRONMENTAL AND ENGINEERING SERVICE CENTER
Washington State Department of Transportation
NORTH SPOKANE LIMITED ACCESS CORRIDOR
ACCESS POINT REVISION REPORT
B

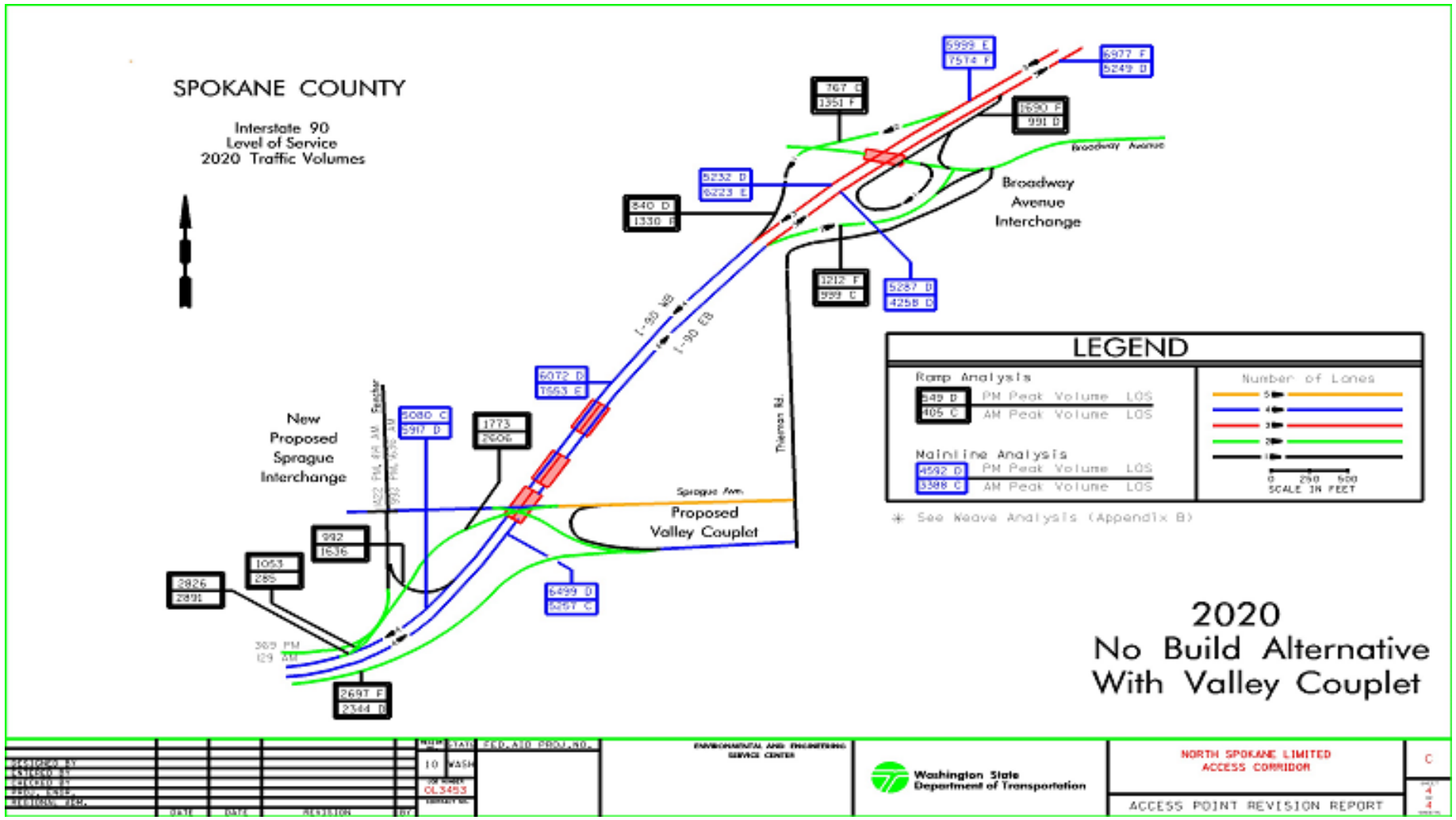

CITY OF SPOKANE
Interstate 90
Level of Service
2020 Traffic Volumes
SPOKANE COUNTY
CITY LIMITS
Havana Street
Cedar Street
2nd Ave.
3rd Ave.
4th Ave.
I-90 WB
I-90 EB
6921 F
8107 F
6921 D
8107 E
8551 F
7070 F
8551 F
7070 D
LEGEND
Ramp Analysis
549 D
905 C
PM Peak Volume LOS
AM Peak Volume LOS
Mainline Analysis
4592 D
6388 C
PM Peak Volume LOS
AM Peak Volume LOS
Number of Lanes
0 250 500
SCALE IN FEET
See Weave Analysis (Appendix B)
No Build Alternative
No Valley Couplet
10
WASH
FED. AID PROJ. NO.
Washington State Department of Transportation
NORTH SPOKANE LIMITED ACCESS CORRIDOR
ACCESS POINT REVISION REPORT
B

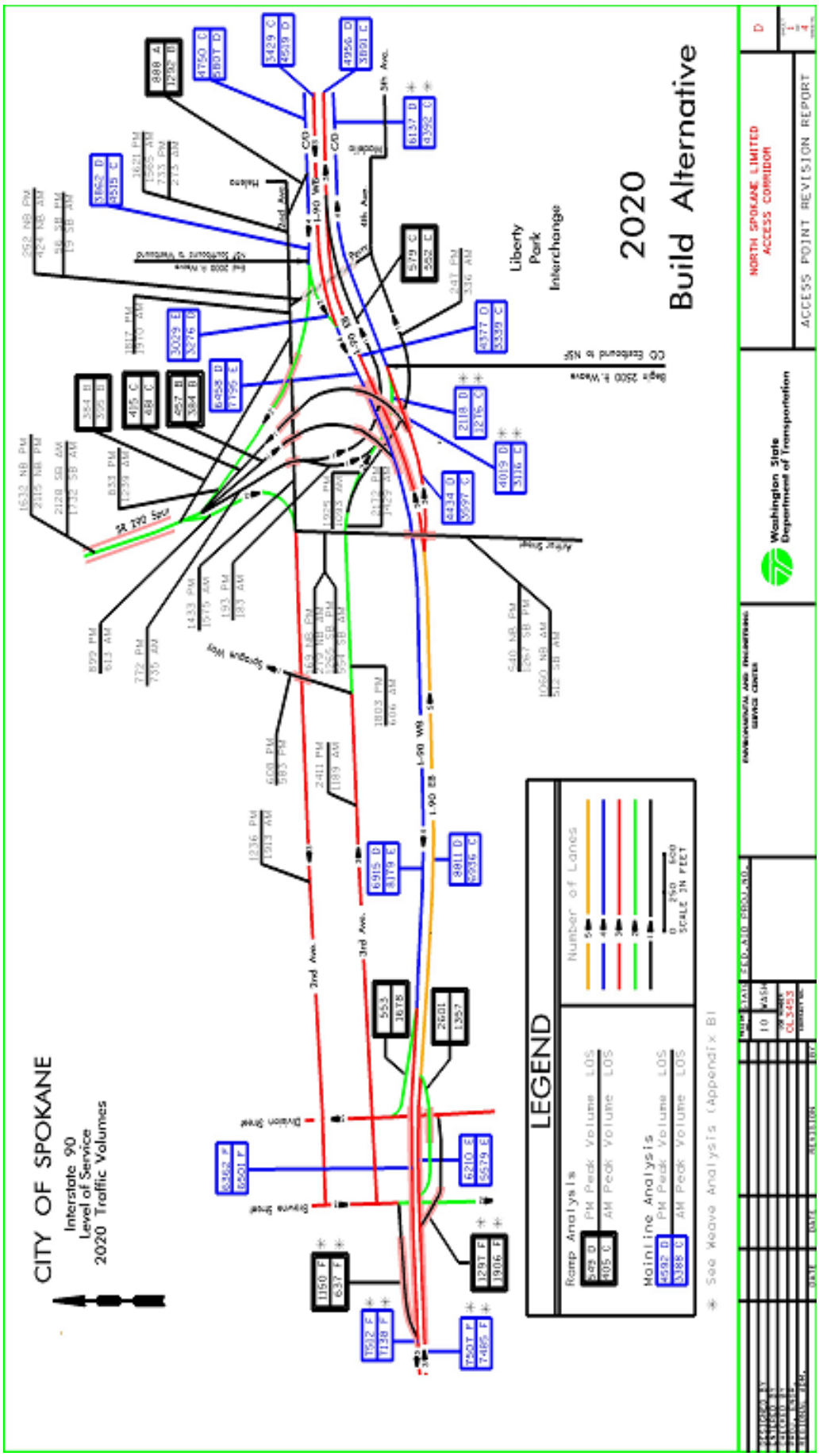

No Build Alternative
No Valley Couplet
LEGEND
Ramp Analysis
PM Peak Volume LOS
AM Peak Volume LOS
Mainline Analysis
PM Peak Volume LOS
AM Peak Volume LOS
Number of Lanes
SCALE IN FEET
* See Weave Analysis (Appendix B)
Broadway Avenue Interchange
Sprague Avenue Interchange
4th Avenue Connection (SVA)
SPOKANE COUNTY
Interstate 90
Level of Service
2020 Traffic Volumes
NORTH SPOKANE LIMITED ACCESS COMMIDOR
ACCESS POINT REVISION REPORT
Washington State Department of Transportation

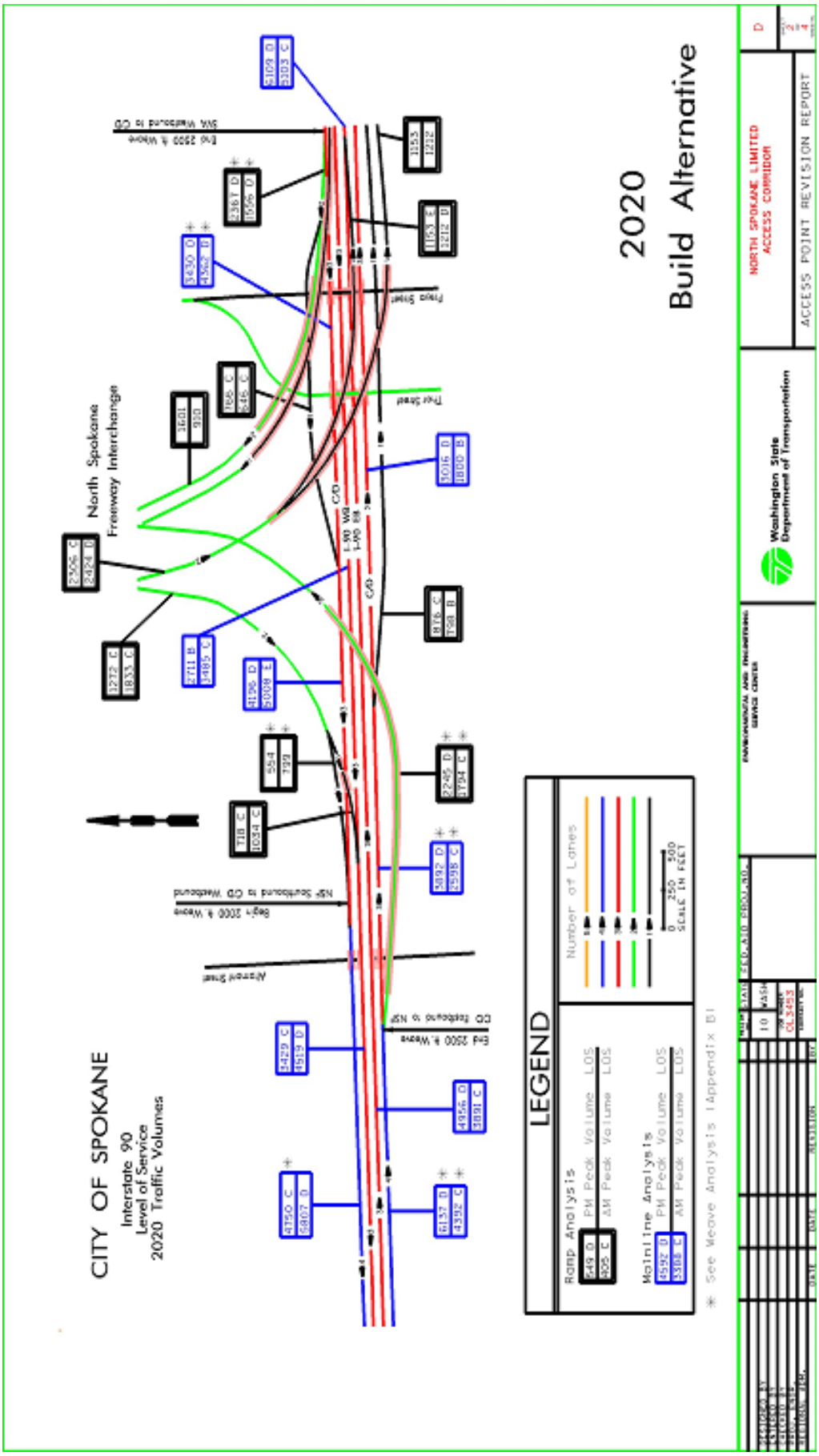

CITY OF SPOKANE
Interstate 90
Level of Service
2020 Traffic Volumes
Browne Street
Division Street
2nd Avenue
3rd Avenue
I-90 WB
I-90 EB
SR 290 (Spur)
Liberty
Park
Interchange
LEGEND
Ramp Analysis
549 D
PM Peak Volume LOS
405 C
AM Peak Volume LOS
Mainline Analysis
6592 D
PM Peak Volume LOS
3388 C
AM Peak Volume LOS
Number of Lanes
0 250 500
SCALE IN FEET
* See Weave Analysis (Appendix B)
2020
No Build Alternative
With Valley Couplet
Washington State
Department of Transportation
NORTH SPOKANE LIMITED
ACCESS CORRIDOR
ACCESS POINT REVISION REPORT

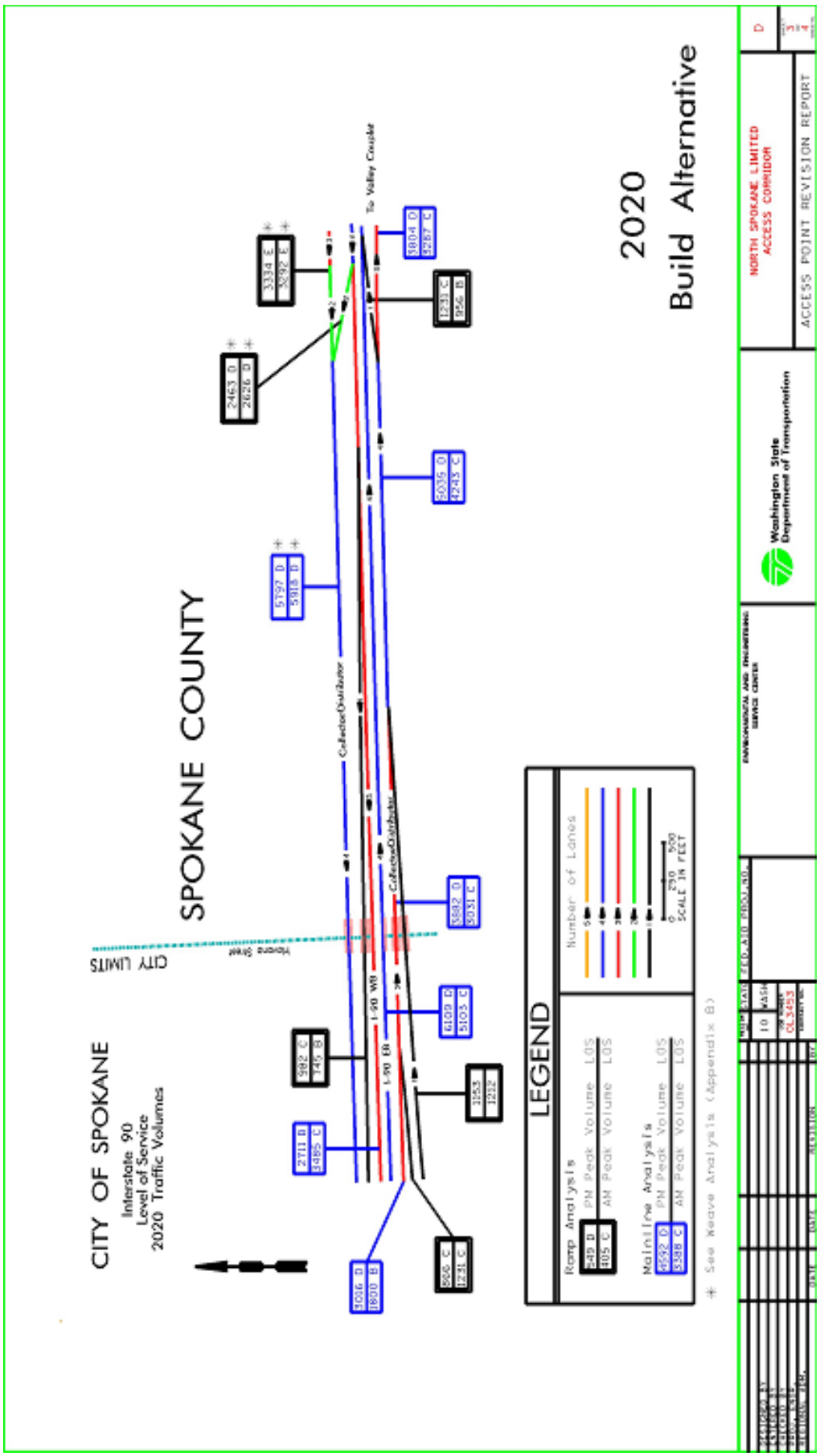

CITY OF SPOKANE
Interstate 90
Level of Service
2020 Traffic Volumes
2020
No Build Alternative
With Valley Couplet
LEGEND
Ramp Analysis
PM Peak Volume LOS
AM Peak Volume LOS
Mainline Analysis
PM Peak Volume LOS
AM Peak Volume LOS
Number of Lanes
Washington State Department of Transportation
NORTH SPOKANE LIMITED ACCESS CORRIDOR
ACCESS POINT REVISION REPORT

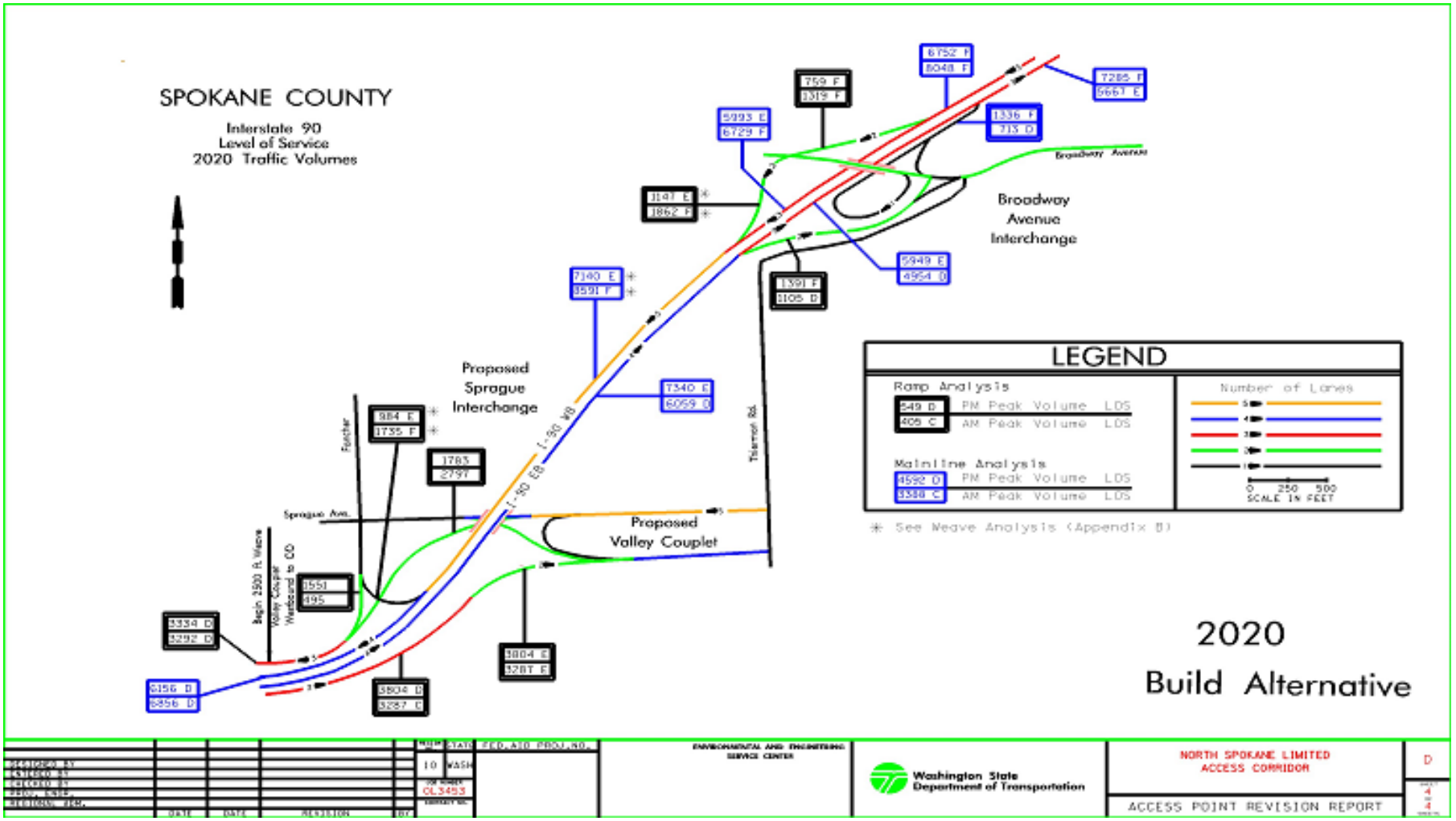

CITY OF SPOKANE
Interstate 90
Level of Service
2020 Traffic Volumes
CITY LIMITS
Havana Street
SPOKANE COUNTY
7906 F
3808 F
7906 E
3808 F
2nd Ave.
3rd Ave.
I-90 WB
I-90 EB
3rd Ave.
4th Ave.
Custer Street
2697 F
2344 D
2896 F
7601 F
2896 F
7601 E
LEGEND
Ramp Analysis
549 D
405 C
PM Peak Volume LOS
AM Peak Volume LOS
Mainline Analysis
4592 D
3388 C
PM Peak Volume LOS
AM Peak Volume LOS
Number of Lanes
5
4
3
2
1
0 250 500
SCALE IN FEET
* See Weave Analysis (Appendix B)
2020
No Build Alternative
With Valley Couplet
90
10
WASH
CL3453
FED. AID PROJ. NO.
ENVIRONMENTAL AND ENGINEERING SERVICE CENTER
Washington State Department of Transportation
NORTH SPOKANE LIMITED ACCESS CORRIDOR
ACCESS POINT REVISION REPORT
C


SPOKANE COUNTY
Interstate 90
Level of Service
2020 Traffic Volumes
Broadway Avenue Interchange
New Proposed Sprague Interchange
Proposed Valley Couplet
I-90 WB
I-90 EB
Thierman Rd.
Sprague Ave.
Broadway Avenue
LEGEND
Ramp Analysis
549 D PM Peak Volume LOS
405 C AM Peak Volume LOS
Mainline Analysis
4592 D PM Peak Volume LOS
3388 C AM Peak Volume LOS
Number of Lanes
SCALE IN FEET
* See Weave Analysis (Appendix B)
2020
No Build Alternative
With Valley Couplet
NORTH SPOKANE LIMITED ACCESS CORRIDOR
ACCESS POINT REVISION REPORT
Washington State Department of Transportation


2020
Build Alternative
CITY OF SPOKANE
Interstate 90
Level of Service
2020 Traffic Volumes
LEGEND
Ramp Analysis
PM Peak Volume LOS
AM Peak Volume LOS
Mainline Analysis
PM Peak Volume LOS
AM Peak Volume LOS
Number of Lanes
* See Weave Analysis (Appendix B)
Liberty Park Interchange
NORTH SPOKANE LIMITED ACCESS CORRIDOR
ACCESS POINT REVISION REPORT
Washington State Department of Transportation


2020
Build Alternative
CITY OF SPOKANE
Interstate 90
Level of Service
2020 Traffic Volumes
North Spokane
Freeway Interchange
LEGEND
Ramp Analysis
PM Peak Volume LOS
AM Peak Volume LOS
Mainline Analysis
PM Peak Volume LOS
AM Peak Volume LOS
Number of Lanes
SCALE IN FEET
* See Weave Analysis (Appendix B)
NORTH SPOKANE LIMITED ACCESS CORRIDOR
ACCESS POINT REVISION REPORT
Washington State Department of Transportation


2020
Build Alternative
NORTH SPOKANE LIMITED ACCESS CORRIDOR
ACCESS POINT REVISION REPORT
Washington State Department of Transportation
SPOKANE COUNTY
CITY LIMITS
CITY OF SPOKANE
Interstate 90
Level of Service
2020 Traffic Volumes
I-90 WB
I-90 EB
To Valley Couplet
CollectorDistributor
LEGEND
Ramp Analysis
PM Peak Volume LOS
AM Peak Volume LOS
Mainline Analysis
PM Peak Volume LOS
AM Peak Volume LOS
Number of Lanes
SCALE IN FEET
See Weave Analysis (Appendix B)

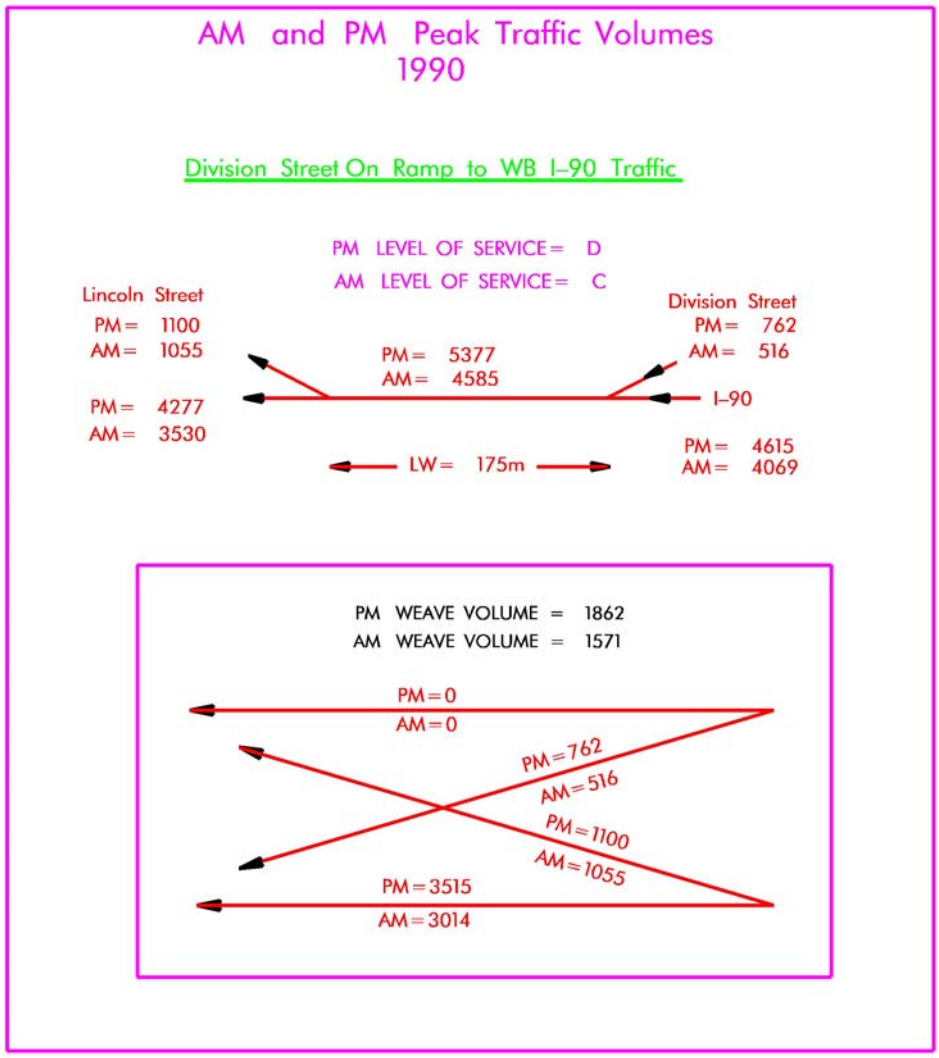

SPOKANE COUNTY
Interstate 90
Level of Service
2020 Traffic Volumes
Broadway Avenue Interchange
Proposed Sprague Interchange
Proposed Valley Couplet
I-90 WB
I-90 EB
Sprague Ave.
Fancher
Thierman Rd.
Broadway Avenue
6752 F
6048 F
7285 F
9661 E
759 F
1319 F
5393 E
6729 F
1336 F
713 D
3147 E
1862 F
5949 E
4964 D
7180 E
9891 F
1391 F
1105 D
7340 E
6059 D
984 E
1735 F
1783
2797
551
495
3334 D
3292 D
5156 D
5356 D
5804 D
3287 C
3804 E
3287 E
LEGEND
Ramp Analysis
549 D PM Peak Volume LOS
408 C AM Peak Volume LOS
Mainline Analysis
4592 D PM Peak Volume LOS
3588 C AM Peak Volume LOS
Number of Lanes
0 250 500
SCALE IN FEET
* See Weave Analysis (Appendix B)
2020
Build Alternative
Washington State Department of Transportation
NORTH SPOKANE LIMITED ACCESS CORRIDOR
ACCESS POINT REVISION REPORT
D

APPENDIX B

WEAVE ANALYSIS

1990

Weaving Analysis
(J. Leisch Method)
Freeway Access Report for North Spokane Freeway
Analysis by WSDOT August, 1997



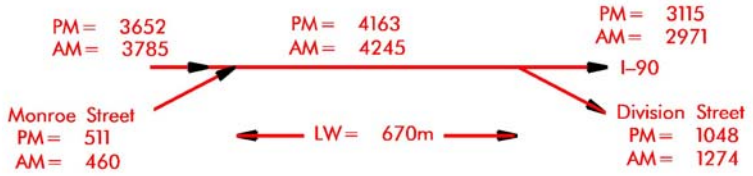
1990

Weaving Analysis
(J. Leisch Method)
Freeway Access Report for North Spokane Freeway
Analysis by WSDOT August, 1997

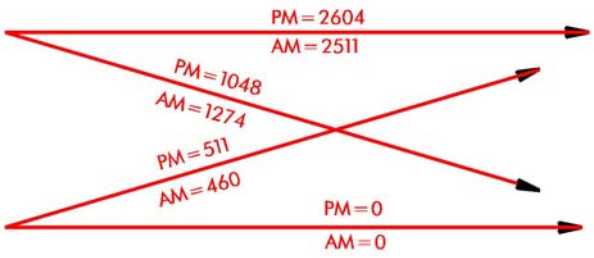
AM and PM Peak Traffic Volumes
1990

Division Street Off Ramp from EB I–90 Traffic

PM LEVEL OF SERVICE = B
AM LEVEL OF SERVICE = B



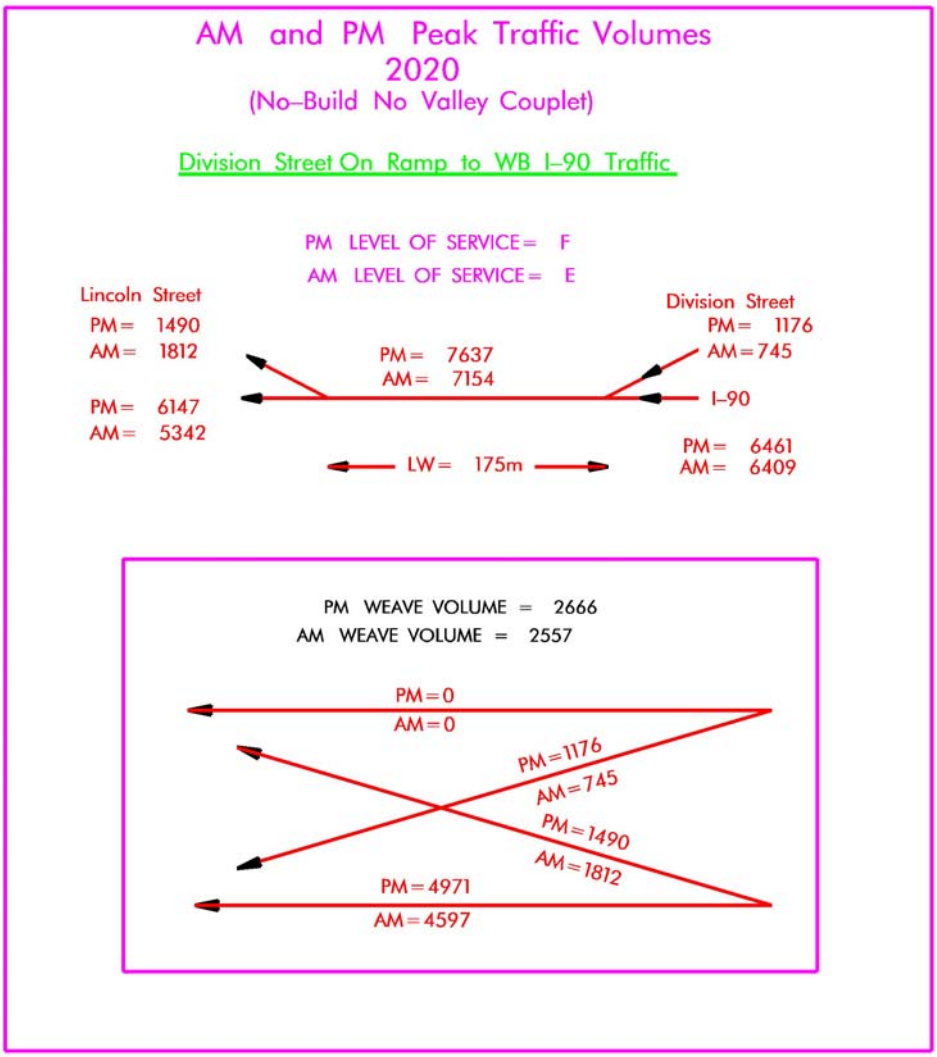
PM WEAVE VOLUME = 1559
AM WEAVE VOLUME = 1734



2020 No Build No Valley Couplet

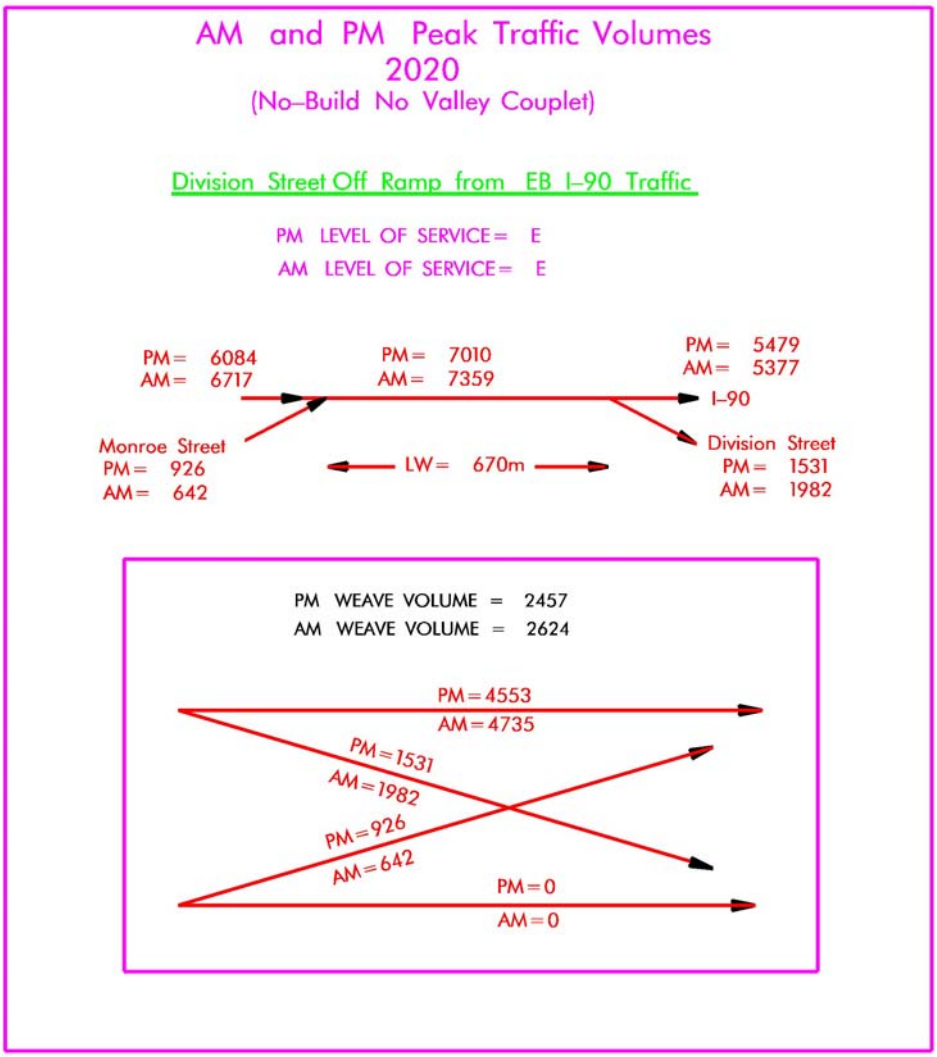
Weaving Analysis
(J. Leisch Method)
Freeway Access Report for North Spokane Freeway

Analysis by WSDOT August, 1997



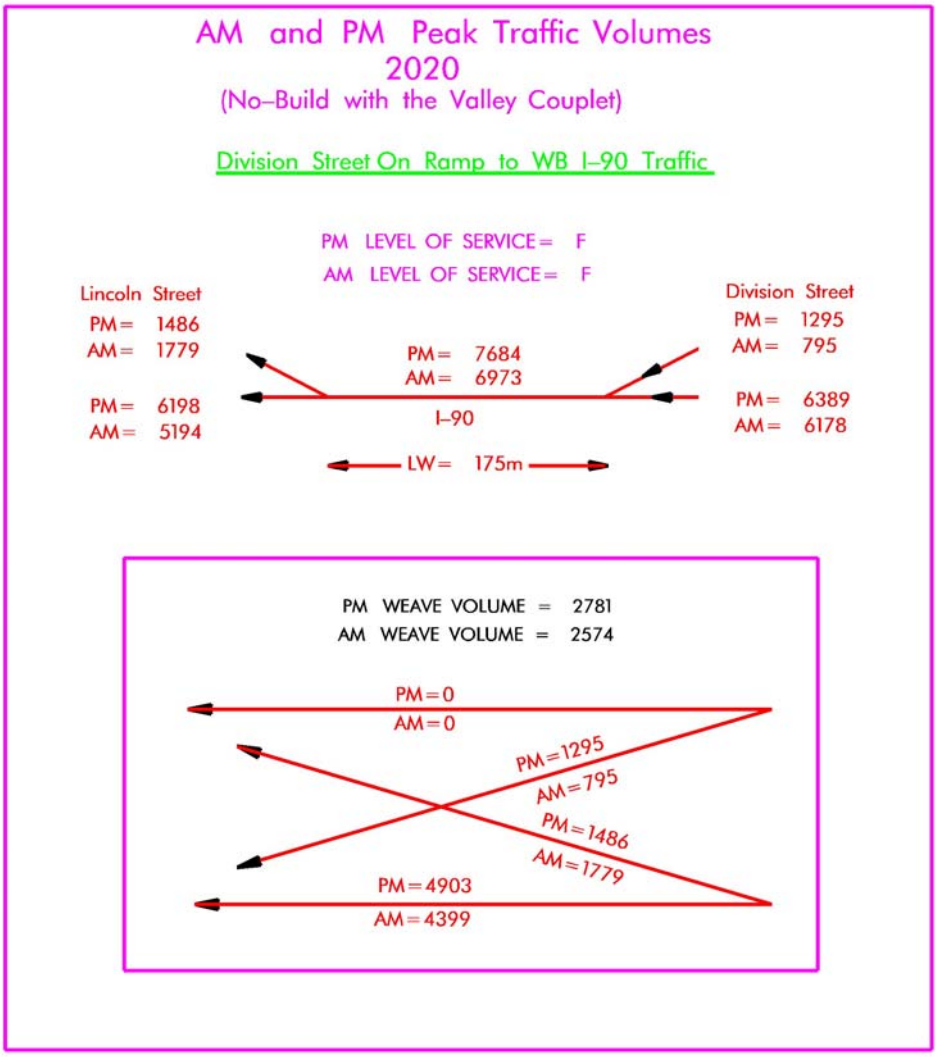
2020 No Build No Valley Couplet

Weaving Analysis
(J. Leisch Method)
Freeway Access Report for North Spokane Freeway
Analysis by WSDOT August, 1997



2020 No Build With Valley Couplet

Weaving Analysis
(J. Leisch Method)
Freeway Access Report for North Spokane Freeway
Analysis by WSDOT August, 1997



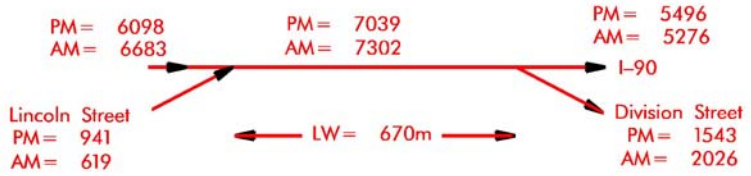
2020 No Build With Valley Couplet

Weaving Analysis
(J. Leisch Method)
Freeway Access Report for North Spokane Freeway
Analysis by WSDOT August, 1997

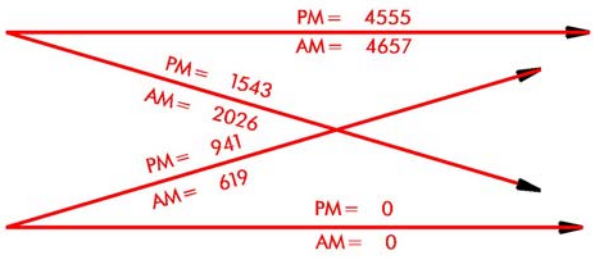
AM and PM Peak Traffic Volumes
2020
(No–Build with the Valley Couplet)

Division Street Off Ramp from EB I–90 Traffic

PM LEVEL OF SERVICE = F
AM LEVEL OF SERVICE = F



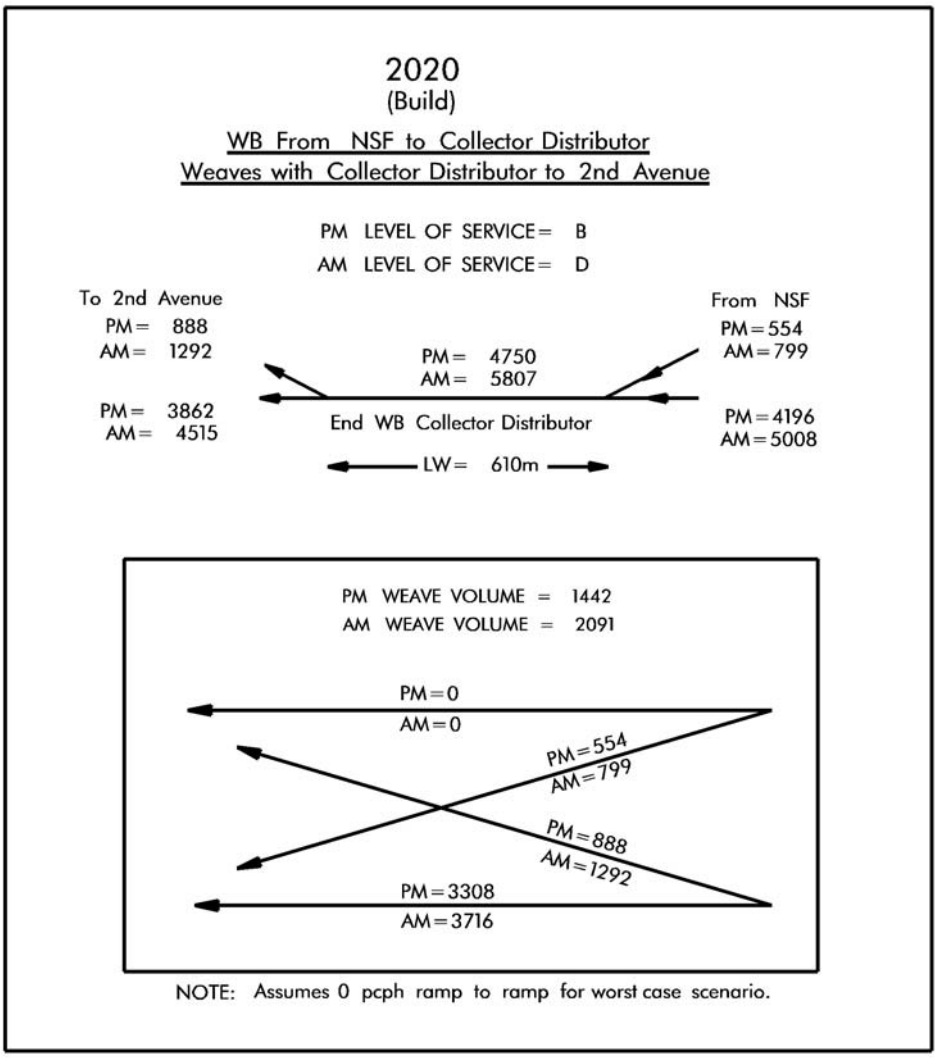
PM WEAVE VOLUME = 2484
AM WEAVE VOLUME = 2645



NOTE: Assumes ½ of traffic split from Valley Couplet to I–90 & NSF.

2020 Build

Weaving Analysis
(J. Leisch Method)
Freeway Access Report for North Spokane Freeway
Analysis by WSDOT August, 1997



2020 Build

Weaving Analysis
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Freeway Access Report for North Spokane Freeway
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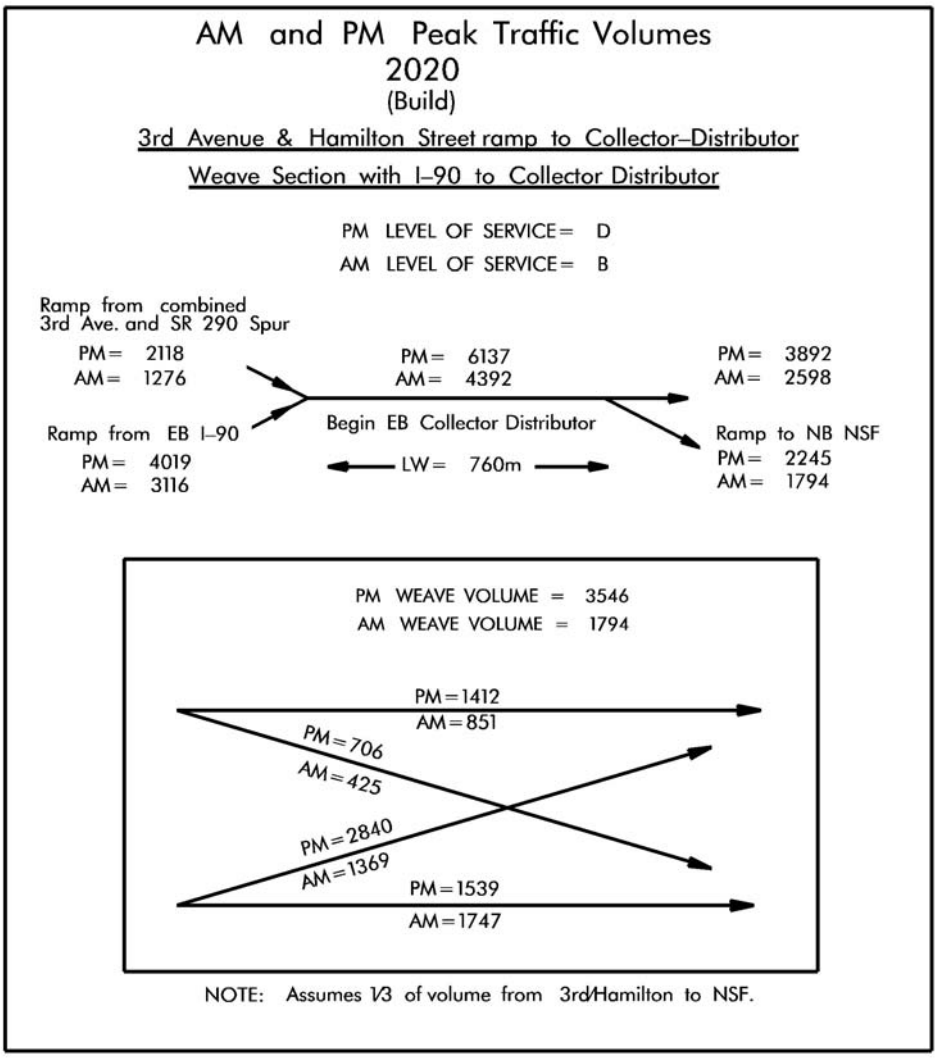
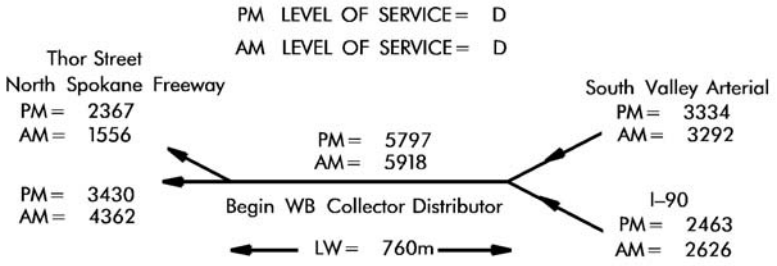


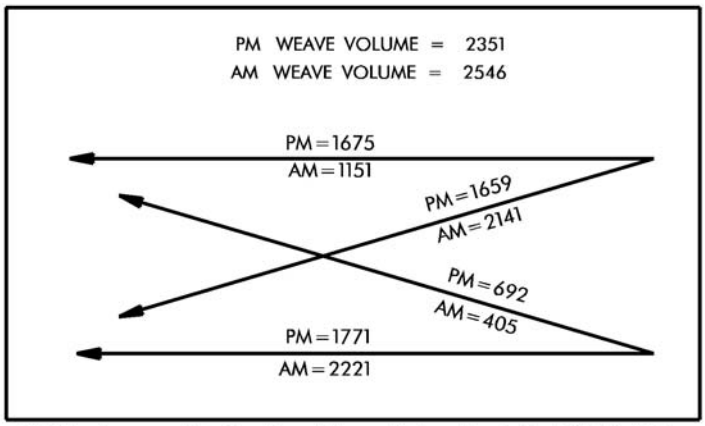
2020 Build

Weaving Analysis
(J. Leisch Method)
Freeway Access Report for North Spokane Freeway
Analysis by WSDOT August, 1997

AM and PM Peak Traffic Volumes
2020
(Build)

WB Valley Couplet to Collector–Distributor
with WB I–90 traffic to NSF & Thor St.





NOTE: Assumes 1/2 of traffic split from Valley Couplet to I–90 & NSF.

2020 Build

Weaving Analysis
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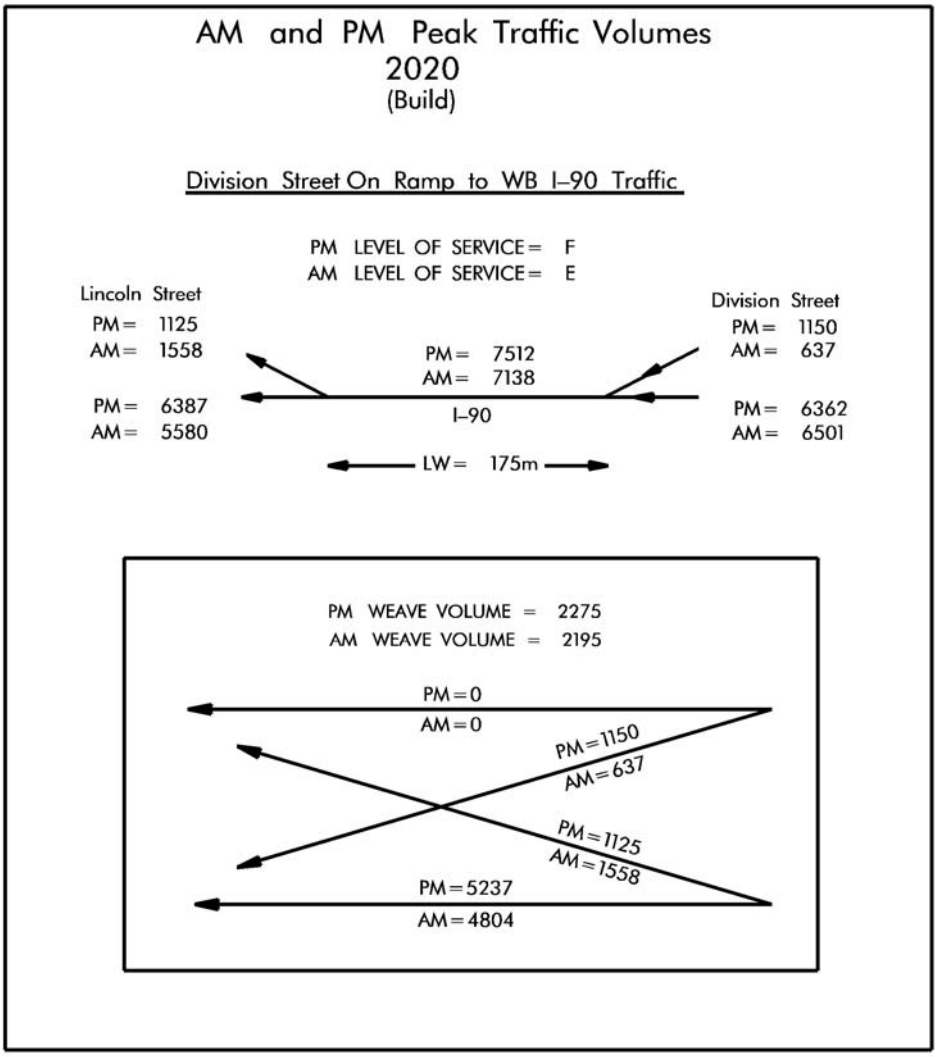

2020 Build

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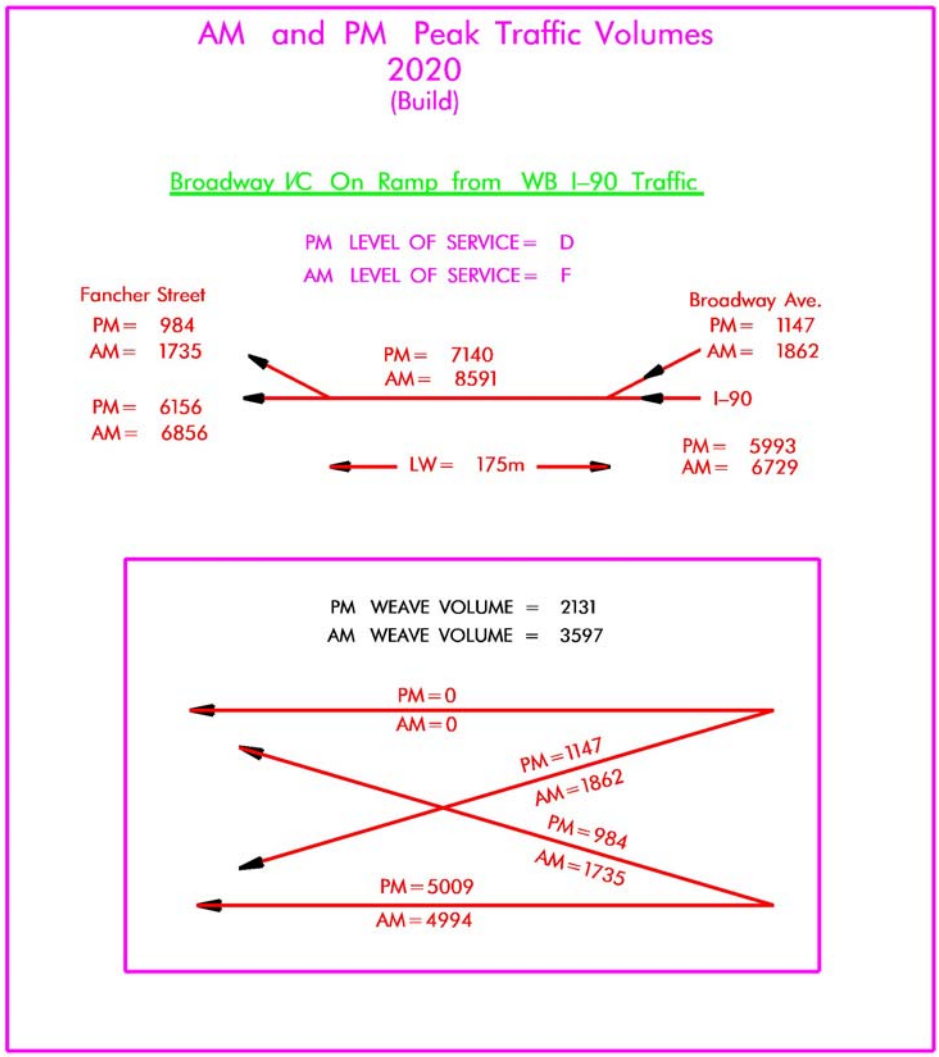

2020 Build

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